SIEMENS

# LITHOSTAR MODULARIS

SP

## Troubleshooting Guide

System

Troubleshooting Guide

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# Safety Information and Protective Measures

- Observe the safety measures described .

**⚠CAUTION**

**When performing service work and tests, observe:**

- ➪ **the product-specific safety information in the documents, as well as the general safety information contained in ARTD, Part 2.**
- ➪ **Disconnect the power cable when working on the system.**
- ➪ **Disconnect the power cable when working on the system.**
- ➪ **When working with the power on, observe the general safety regulations.**
- ➪ **Observe ESD guidelines.**
- ➪ **Switch off the system prior to replace boards or assemblies.**
- ➪ **After completing all service work and reattaching the cover panels, perform the ground wire measurement as specified in ARTD-002.731.17.**
- ➪ **Ground wire resistance may not exceed 0.2 Ohms.**
- ➪ **When servicing the power-on assembly (replacing the power-on assembly or the power cable), the equivalent leakage current must be measured and documented.**
- ➪ **Tests and adjustments performed with radiation on are identified by the radiation warning symbol ☢ .**
- ➪ **Radiation protection must be worn during these types of adjustments (refer to ARTD, Part 2).**

## Applicability and Regulations for the Country Organizations

### Equivalent Leakage Current Measurement

The equivalent leakage current must be measured where applicable under the requirements of DIN VDE 0751, Part 1.

Where DIN VDE 0751 does not apply, the country organizations should comply with the following regulations (refer to ARTD - 002.731.17, as well as the safety-technical regulations for installation and maintenance).

The local national regulations apply primarily for the country organizations.

In the event that there are no existing local regulations, the following provisions should be observed in the interest of the safety of customers, patients, employees and third parties as well as the company.

### Initial Measured Value

The equivalent leakage current measurement was performed at the factory and the value measured was entered in Test Protocol 1. The measurement was made at the line voltage and line frequency indicated in Test Protocol 1.

If the on-site line voltage or line frequency differs from the information indicated upon delivery of the Modularis Uro Plus, the values given are invalid. The values should be marked invalid (crossed out with the comment "invalid values" and the service engineer should sign and date this copy).

In this case, the equivalent leakage current must be measured again. The value may not exceed 1 mA according to DIN VDE 0751, Part 1.

The initial value measured must be documented.

Repeat measurements

When service or repair work is performed on the primary power supply circuit (e.g. repairs to the power-on circuit), the equivalent leakage current test must be repeated. The values measured in the subsequent test may not exceed the threshold value of 1 mA as specified in VDE 0751, Part 1. In addition, they may not exceed the initial measured value by more than 50%. If the value exceeds this threshold, the system must be repaired. The value measured must be documented.

## Required Tools and Test Equipment

**NOTE**

**The specified articles are listed in the SCT (Catalog Service Tools) if nothing else is indicated (the STC is a component of the Spare Parts Catalog).**

| | |
|---|---|
| • Standard service equipment | |
| • Service PC, see intranet, service laptop for CSEs | |
| • PC connection cable, 5 m | 99 00 440 RE999 |
| • ESD equipment | |
| • Bender safety tester | 97 06 979 Y0526 |
| • Digital voltmeter, e.g. FLUKE 187 | 99 94 831Y4290 |
| • Shock wave pressure test unit | 30 95 408 J1008 |
| • Adapter for C-head | 98 17 347 J1008 |

## Required Aids and Documents

- SIREMOBIL Iso-C Service Instructions SPR2-230.061.01..

# Product-specific Information

This document is valid for the established Lithostar Modularis and the new "low end lithotripter" called the Modularis Vario. Overview of difference between the two units:

## Modularis

- (1) Shock wave head C with **120 mm** focus depth.
- (2) Length of therapy arm incl. shock head = **1800 mm**.
- (3) Energy charging unit with **spark gap technology**.
- (4) Docking technology implemented with **docking plate**.

## Modularis Vario

- (1) Shock wave head **C plus** with a focus depth of **140 mm (*1)** including an adapted isocenter phantom.
- (2) Length of therapy arm incl. shock head = **900 mm**.
- (3) Energy charging unit with **fast high voltage switch (*2**).
- (4) Docking technology implemented with **docking mandrel**.

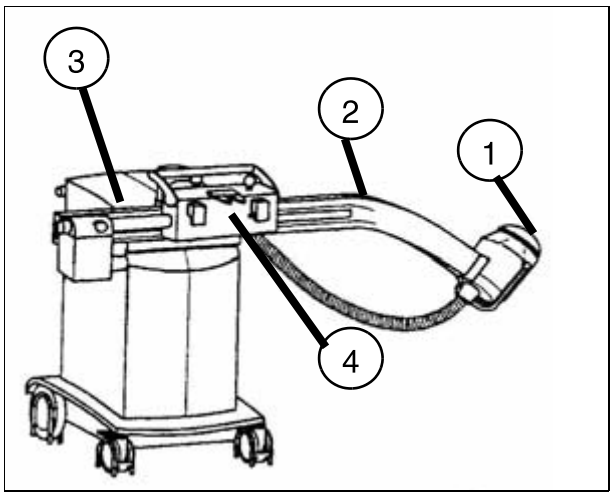



*Fig. 1: Modularis*

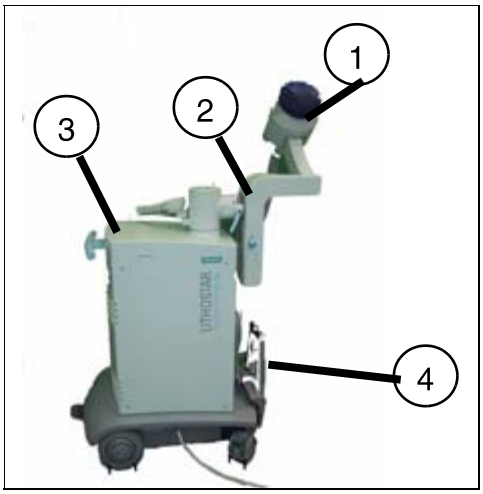



*Fig. 2: Modularis Vario*

*1 The shock wave head **C**$_{plus}$ with a 140-mm focal depth is upgradable for the normal Modularis unit. In this case, it is not different in every way. All new Modularis units will be shipped with shock wave head **C** $_{plus}$ (July 2003, except USA ).

*2 The spark gap will no longer be used in the Multiline and Modularis Lithotripters. Beginning July 2003, all charging units will be equipped with the "Fast High Voltage Switch". This switch is not a consumable and not a spare part. Thus the only spare part is the charging unit.

**NOTE**

**By observing the above mentioned differences, all known technical information is usable for the established Modularis and the Modularis Vario.**

**NOTE**

**Error messages from the SIREMOBIL Iso-C have not been listed. (Refer to the SIREMOBIL Iso-C service documents**

## Info, E00 and E99

| | | |
|---|---|---|
| E00 | Error Text: | System was switched on. |
| | Possible cause/action: | |
| E99 | Error Text: | The system was switched off without deleting the therapy data. |
| | Possible cause/action: | Press the Reset button. |

## Water System, E10-E12

LITHOSTAR MODULARIS circuit diagram J1048, pages 13 and 14.

| | | |
|---|---|---|
| E10 | Error Text: | Cooling system losing water. |
| | Possible cause/action: | Is water running out of the hoses?<br>$P_{min}$ switch o.k.?<br>D3.X3 board connection o.k.?<br>Fill the cooling system. |
| E11 | Error Text: | Maximum pressure in the cooling system exceeded.<br>Pressure switch $P_{max}$ responded. |
| | Possible cause/action: | Are the hoses blocked, kinked?<br>$P_{max}$ switch o.k.?<br>D3.X3 board connection o.k?<br>Is the cooling unit operating?<br>Check the fill level in the cooling system. |
| E12 | Error Text: | Minimum pressure in the cooling system exceeded.<br>Pressure switch $P_{min}$ responded. |
| | Possible cause/action: | Is water running out of the hoses and hose connections?<br>Air in the cooling system?<br>Check the fill level in the cooling system. |

## Water System, E14-E15

| | | |
|---|---|---|
| E14 | Error Text: | Water level too low in the water reservoir tank. |
| | Possible cause/action: | Not enough water in the tank.<br>Float switch in the tank o.k.?<br>D3.X3 board connection o.k.?<br>Completely fill the coupling bellows, deselect automatic pressure regulation, and drain the water.<br>Repair any leaks.<br>Refill the water in the reservoir tank. |
| E15 | Error Text: | Coupling pressure not o.k. |
| | Possible cause/action: | Pressure sensor on the shock head o.k.?<br>If water can still be pumped out, the sensor is probably defective (refer to "Working with the Terminal Program: Show Diagnostic Data").<br>Suction hose correctly inserted in the coupling bellows?<br>Return hose kinked?<br>D3.X8 board connection o.k.?<br>Fill the coupling system.<br>If the error occurs only with obese patients, the suction hose in the coupling bellows may be kinked. |

## Controls, E20-E21

If the control panel is dark: check fuse F5 on the D3 board.

| | | |
|---|---|---|
| E20 | Error Text: | No contact with the control unit (this error is visible only when reading out the error log with the service PC). |
| | Possible cause/action: | X5 connection cable correctly connected to the control unit?<br>Check the F5 fuse on the D3 board.<br>If the error occurs after replacing the D3 board: is X35 connector properly connected? |
| E21 | Error Text: | X-ray button on the control unit activated with switch-on. |
| | Possible cause/action: | X-ray button stuck?<br>Control unit o.k.?<br>Cable o.k.? |

## Controls, E22-E25

| | | |
|---|---|---|
| E22 | Error Text: | QRS signal from ECG unit missing, i.e. no ECG triggering possible. |
| | Possible cause/action: | Trigger cable connected to ECG unit?<br>ECG triggering selected on the control unit? Trigger cable plugged in on D3.X70? |
| E23 | Error Text: | Motor for C-Arm movement in LITHOSTAR MODULARIS drawing too much current. |
| | Possible cause/action: | C-Arm moving freely?<br>SIREMOBIL Iso-C cable connected?<br>Brake in SIREMOBIL Iso-C can be released, i.e. is the motor not locked?<br>Brake connection cable in SM Iso-C o.k.? (D3.X38 - SM Iso-C)<br>Motor connection cable o.k. (board D3.X36)?<br>D3 board?<br>Motor connection cable o.k. (D3.X36 board)?<br>Settings for the SIREMOBIL Iso brakes o.k.? (Angulation and orbital in 0°. LITHOSTAR MODULARIS not coupled. Attach a spring balance at the handle near the I.I. Release the angulation brake and pull with the spring balance. The C-Arm must move when the spring balance indicates a value from 20N-30N - preferably close to 20 N. Settings are made at the position where the angulation motor is coupled. Wrench size 30 mm, coupling must be removed). Also refer to SPR2-230.061.01... chapter 7.<br>D3 board? |
| E24 | Error Text: | C-Arm blocked.<br>No change on the actual value potentiometer in LITHOSTAR MODULARIS. |
| | Possible cause/action: | C-Arm moving freely?<br>Potentiometer o.k.?<br>Correct tension on the belt?<br>Connection cable to potentiometer o.k.? (D3.X38)<br>Check the setting of the SIREMOBIL angulation brake (see E23) |
| E25 | Error Text: | C-Arm potentiometer not working. |
| | Possible cause/action: | Potentiometer connected?<br>Check the D3.X30 connector!<br>Connect the cable to the potentiometer. |

## Controls, E26-E29

| | | |
|---|---|---|
| E26 | Error Text: | ECG option not installed. |
| | Possible cause/action: | Warning message only. |
| E27 | Error Text: | Control unit. |
| | Possible cause/action: | Key sticking.<br>Replace control panel. |
| E28 | Error Text: | C-Arm pivots in the wrong direction. |
| | Possible cause/action: | Cables connected incorrectly to the potentiometer or the motor?<br>Correct tension on the belt?<br>Check the setting of the SIREMOBIL angulation brake (see E23). |
| E29 | Error Text: | Shock wave release button sticking. |
| | Possible cause/action: | Check control unit. Circuit diagram J1048 - 25. |

## Monitoring, E31-E34

| | | |
|---|---|---|
| E31 | Error Text: | Temperature sensor supplying incorrect data. |
| | Possible cause/action: | Temperature sensor o.k.?<br>D3.X2 connection cable o.k.?<br>The temperature difference can be read out on the service PC. |
| E32 | Error Text: | The temperature at the shock wave head has exceeded the maximum value. |
| | Possible cause/action: | Let the shock wave head cool down, but do not switch the system off!<br>Check to ensure that the cooling unit is operating.<br>If the M1 cooling pump is running, the pump head may need to be replaced.<br>If the error reoccurs, check the function of the cooling unit. |
| E34 | Error Text: | Temperature cannot be determined: could not access the ADC when converting the analog values from the temperature sensor.<br>Voltage supply for the temperature sensors outside acceptable range. |
| | Possible cause/action: | D3.X2 connection cable o.k.?<br>D3 board?<br>Read out the temperature with the service PC.<br>Refer also to error 45. |

## Monitoring, E40-E48

| | | |
|---|---|---|
| E40 | Error Text: | Cooling pump fuse defective. |
| | Possible cause/action: | F2 fuse on D3 board o.k.? |
| E41 | Error Text: | M1 cooling pump defective. |
| | Possible cause/action: | M1 motor o.k.? Circuit diagram J1048 - 13<br>D3.X7 connection cable o.k.? |
| E42 | Error Text: | Coupling pump defective. |
| | Possible cause/action: | M2 motor o.k.? Circuit diagram J1048 - 13<br>D3.X7 connection cable o.k.? |
| E43 | Error Text: | Fuse for coupling pump defective. |
| | Possible cause/action: | F3 fuse on D3 board o.k.? |
| E44 | Error Text: | 5 volt power supply defective. |
| | Possible cause/action: | Replace D3 board. |
| E45 | Error Text: | 18 volt power supply defective. |
| | Possible cause/action: | LED VCC18 on D3 board o.k.? Circuit diagram J1048 - 11<br>D3.X8 connection cable o.k.?<br>Check the power supply for the pressure sensors! |
| E46 | Error Text: | 17 volt power supply defective |
| | Possible cause/action: | LED VCC17 on D3 board o.k.?<br>Replace D3 board. |
| E47 | Error Text: | Valve and card terminal fuse defective? |
| | Possible cause/action: | Short circuit?<br>F4 fuse on D3 board? Circuit diagram J1048 - 13<br>Check valve (coupling circuit).<br>Check card terminal. |
| E48 | Error Text: | Reference for temperature sensors defective. |
| | Possible cause/action: | Replace temperature sensors.<br>Replace D3 board. |

## Monitoring, E49-E54

| | | |
|---|---|---|
| E49 | Error Text: | Reference potentiometer defective. |
| | Possible cause/action: | Short circuit in potentiometer for C-arm movement or potentiometer for ultrasound probe (only if option is available)?<br>D3.X38, D3.X28 connection cable (ultrasound option) o.k.?<br>Circuit diagram J1048 - 16/17.<br>Use the service PC to read the current potentiometer (menu "d").<br>For troubleshooting when the ultrasound option is available: Remove the board for the ultrasound option and cables X28 and X29 from the D3 board. |
| E50 | Error Text: | -5 volt power supply defective. |
| | Possible cause/action: | Replace D3 board. |
| E52 | Error Text: | Battery voltage for battery-buffered RAM and real-time clock too low. |
| | Possible cause/action: | Replace the lithium battery on the D3 board. |
| E53 | Error Text: | Incorrect data in the battery-buffered RAM. |
| | Possible cause/action: | Normal occurrence during initial startup or after replacing the lithium battery.<br>Check the lithium battery!<br>Replace the D3 board.<br>Perform a software download! |
| E54 | Error Text: | Clock stopped (this message is also displayed when the battery is replaced) |
| | Possible cause/action: | D3.X31 - XP7 connection cable present under the cover?<br>Set the clock! |

## High Voltage Circuit, E60 - E67

LITHOSTAR MODULARIS circuit diagram J1048 - 12.

| | | |
|---|---|---|
| E60 | Error Text: | Charging current too low during the charging process. |
| | Possible cause/action: | Check the line voltage!<br>Replace the charging / energy unit! |
| E61 | Error Text: | Overvoltage in the charging unit. |
| | Possible cause/action: | System OFF<br>- 10 minute pause - System ON.<br>Replace the charging / energy unit! |
| E62 | Error Text: | Overtemperature in the charging unit. |
| | Possible cause/action: | Heat in the LITHO MODULARIS?<br>System OFF - 10 minute pause - System ON.<br>Replace the charging / energy unit! |
| E63 | Error Text: | Capacitor defective in the charging / energy unit (out of tolerance). |
| | Possible cause/action: | Replace the charging / energy unit! |
| E64 | Error Text: | Default voltage not attained.<br>Current voltage after frequency converter ($U_{nom}$) is greater than selected voltage. |
| | Possible cause/action: | Check the fiber optic cable! [1])<br>Replace the charging / energy unit! |
| E65 | Error Text: | Charging voltage too high during the charging process. |
| | Possible cause/action: | Replace the charging / energy unit! |
| E66 | Error Text: | Default voltage incorrect. |
| | Possible cause/action: | Check the fiber optic cable! [1])<br>Replace the charging / energy unit! |
| E67 | Error Text: | No ignition of spark gap after trigger pulse (several times). |
| | Possible cause/action: | Check the fiber optic cable! [1])<br>Replace the spark gap! |

## High Voltage Circuit, E68 - E74

| | | |
|---|---|---|
| E68 | Error Text: | Charging current too high during charging process. |
| | Possible cause/action: | Replace the charging / energy unit! |
| E69 | Error Text: | Repeated self-ignition of the spark gap. |
| | Possible cause/action: | Replace the spark gap! |
| E70 | Error Text: | Charging current too low after ignition! |
| | Possible cause/action: | Check the high voltage cable connections!<br>Check the high voltage connector!<br>Replace the shock wave head! |
| E71 | Error Text: | Charging current too high after ignition. |
| | Possible cause/action: | Check the high voltage cable!<br>Check the high voltage connector!<br>Replace the shock wave head! |
| E72 | Error Text: | No communication possible with the charging / energy unit. |
| | Possible cause/action: | Check the line voltage at the charging / energy unit!<br>Replace the fuse in the charging / energy unit!<br>Check the fiber optic cable! [1])<br>Replace the charging / energy unit! |
| E73 | Error Text: | Message: Constancy limit reached. |
| | Possible cause/action: | For user information only.<br>Approx. 10-15 treatments still possible, then error 74 appears. |
| E74 | Error Text: | Constancy limit reached. |
| | Possible cause/action: | The constancy limit has been reached.<br>• Replace the following parts:<br>- shock wave head<br>- spark gap and<br>In addition, replace the water in the entire system! |

| | |
|---|---|
| [1]) | Before replacing the charging / energy unit, check the fiber optic cable (LWL):<br>• Disconnect the fiber optic cable at both ends and check by holding it up to the light<br>or<br>• Place it on the Clk (U5) of the D3 board and check whether light is visible. |

## High Voltage Circuit, E75 - E78

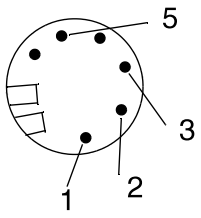
| | | |
|---|---|---|
| E75 | Error Text: | Chip card terminal error (documented in error log only). |
| | Possible cause/action: | Check revision level for D3 board: Rev. 00 - 02: replace D3 board. Rev. 03 and higher: replace chip card reading device.<br>Wrong card or card incorrectly inserted. |
| E76 | Error Text: | Chip card expired |
| | Possible cause/action: | Insert a new card. |
| E77 | Error Text: | Chip card communication error |
| | Possible cause/action: | Check revision level for D3 board: Rev. 00 - 02: replace D3 board. Rev. 03 and higher: replace chip card reading device<br>Cable? If the error reoccurs after replacing the D3 board, is the X33 connector properly connected? |
| E78 | Error Text: | Charging process too long. |
| | Possible cause/action: | Line voltage o.k.?<br>Replace the charging / energy unit! |
| E79 | Error Text: | Short circuit - call Service |
| | Possible cause/action: | High voltage cable or energy unit defect<br>Replace the cable or the energy unit! |

| | |
|---|---|
| [1]) | Before replacing the charging / energy unit, check the fiber optic cable (LWL):<br>• Disconnect the fiber optic cable at both ends and check by holding it up to the light<br>or<br>• Place it on the Clk (U5) of the D3 board and check whether light is visible. |

## Internal Errors, E80-E89

| | | |
|---|---|---|
| E80 | Error Text: | Flash memory defective. |
| | Possible cause/action: | Not applicable for the user.<br>Read out the memory and perform a reset at the next opportunity. |
| E81 | Error Text: | CMOS pulse counter incorrect. |
| | Possible cause/action: | If this error occurs repeatedly, D3 board must be replaced. |
| E82 | Error Text: | Pulse counter backup incorrect |
| | Possible cause/action: | If this error occurs repeatedly, D3 board must be replaced. |
| E83 | Error Text: | CMOS chip card data incorrect |
| | Possible cause/action: | |
| E85 | Error Text: | Measurement acquisition incorrect. |
| | Possible cause/action: | |
| E86 | Error Text: | Flash memory defective |
| | Possible cause/action: | Not applicable for the user.<br>Read out the memory and perform a reset at the next opportunity. |
| E89 | Error Text: | Watchdog responded. |
| | Possible cause/action: | If this error occurs repeatedly, D3 board must be replaced.<br>Appears each time a reset is performed with the S3 switch on D3 board.<br>This error may occur if the system is switched off during initialization. |

## Ultrasound, E90-E93

| | | |
|---|---|---|
| E90 | Error Text:<br>Possible cause/action: | No connection from LITHOSTAR to SONOLINE |
| E91 | Error Text:<br>Possible cause/action: | Potentiometer skips.<br>Cable from potentiometer to D3 board ok? Potentiometer defect?<br>  <br><br>Plug at US holder<br>Value between 1 -3 and 2-5 must be identical.<br>*Fig. 3:* |
| E92 | Error Text: | The two potentiometers have different values. |
| | Possible cause/action: | Dampness on the potentiometer. |
| E93 | Error Text: | Erroneous US values. |
| | Possible cause/action: | C-MOS has lost values. Adjust the potentiometer (point "U" in the service menu).<br>Check the default values (see SPL1-130.038.01...). |

## Displays on the D3 Board

Once the system is turned on, different symbols are displayed chronologically on the D3 board display .

| Display | Possible cause/action |
|---|---|
| 0 | System o.k. (only with the ultrasound localization option and if **a** communication was set up to the ultrasound device.) |
| d | Software download. |
| 1 | Data transfer, the decimal point is blinking. |
| 4 | The receiving file is being checked. |
| 5 | Software download time too long. |
| 7 | Everything o.k. (only if no ultrasound localization option is available or if the ultrasound device is turned off.) |
| - | The service switch is set to normal mode - only for boards that still have no software. |

# Text on the Console

## "Chip card invalid"

- This message is displayed when:
  - the gold card is still logged on a different LITHOSTAR MODULARIS
  - D3 board was replaced and the "init counter" on the gold card is already set to 3.
  - the card is defective.

In the normal mode, check whether the LED 174 on the D3 board blinks temporarily and then remains lit when turning it on.

## LITHOSTAR MODULARIS SIEMENS

This message is displayed when too many errors occur. In this case, use the service PC to generate an error log.

## Missing Isocenter Cross on the Ultrasound System

There is no communication between the ultrasound system and the LITHOSTAR MODULARIS.

## (Hyper) Terminal Program

The Windows (Hyper) Terminal program is used to retrieve error codes, settings, shock wave counts, etc. from the LITHOSTAR MODULARIS and to save them to diskette. The error log and therapy data can only be deleted from the CPU board using this (Hyper) Terminal program. This program is usually located under Accessories in Windows.

The following provides a short overview of the connection procedure.

The standard cable (99 00 440 RE999) is used as the connection cable between the service PC and the LITHOSTAR MODULARIS.

**NOTE**

**Due to the numerous versions and languages for WINDOWS, the connection procedure is described in German and English.**

If there are problems, use the Help function in the (Hyper) Terminal program.

The "Courier New" font is recommended for reading data stored on the diskette.

## German WINDOWS 95/98/NT

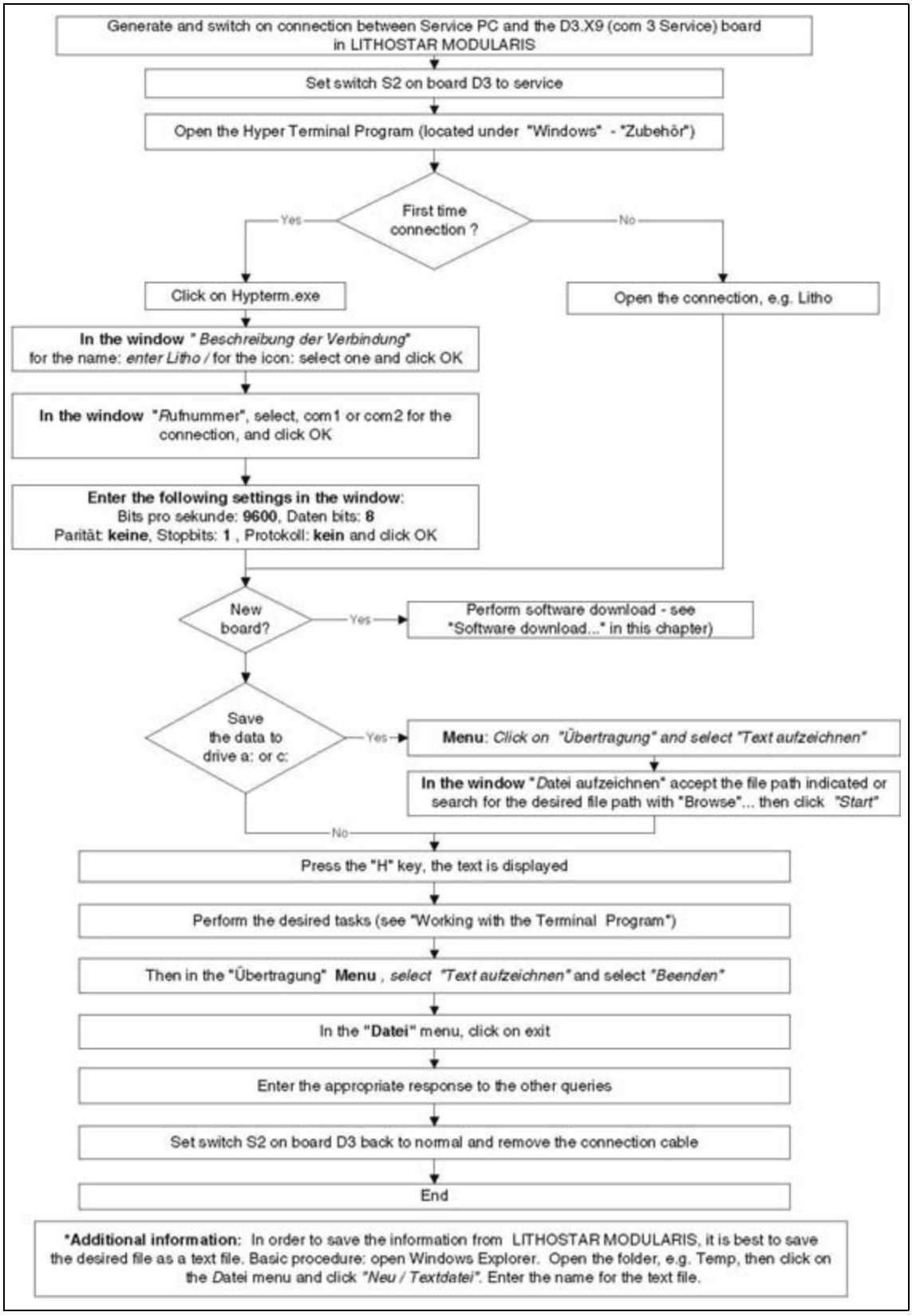

Generate and switch on connection between Service PC and the D3.X9 (com 3 Service) board in LITHOSTAR MODULARIS
Set switch S2 on board D3 to service
Open the Hyper Terminal Program (located under "Windows" - "Zubehör")
First time connection ?
Yes
No
Click on Hypterm.exe
Open the connection, e.g. Litho
In the window "Beschreibung der Verbindung" for the name: enter Litho / for the icon: select one and click OK
In the window "Rufnummer", select, com1 or com2 for the connection, and click OK
Enter the following settings in the window: Bits pro sekunde: 9600, Daten bits: 8 Parität: keine, Stopbits: 1 , Protokoll: kein and click OK
New board?
Yes
Perform software download - see "Software download..." in this chapter)
Save the data to drive a: or c:
Yes
Menu: Click on "Übertragung" and select "Text aufzeichnen"
In the window "Datei aufzeichnen" accept the file path indicated or search for the desired file path with "Browse"... then click "Start"
No
Press the "H" key, the text is displayed
Perform the desired tasks (see "Working with the Terminal Program")
Then in the "Übertragung" Menu , select "Text aufzeichnen" and select "Beenden"
In the "Datei" menu, click on exit
Enter the appropriate response to the other queries
Set switch S2 on board D3 back to normal and remove the connection cable
End
*Additional information: In order to save the information from LITHOSTAR MODULARIS, it is best to save the desired file as a text file. Basic procedure: open Windows Explorer. Open the folder, e.g. Temp, then click on the Datei menu and click "Neu / Textdatei". Enter the name for the text file.

*Fig. 4: German_Windows 95_98_NT*

## English Windows 95/98/NT

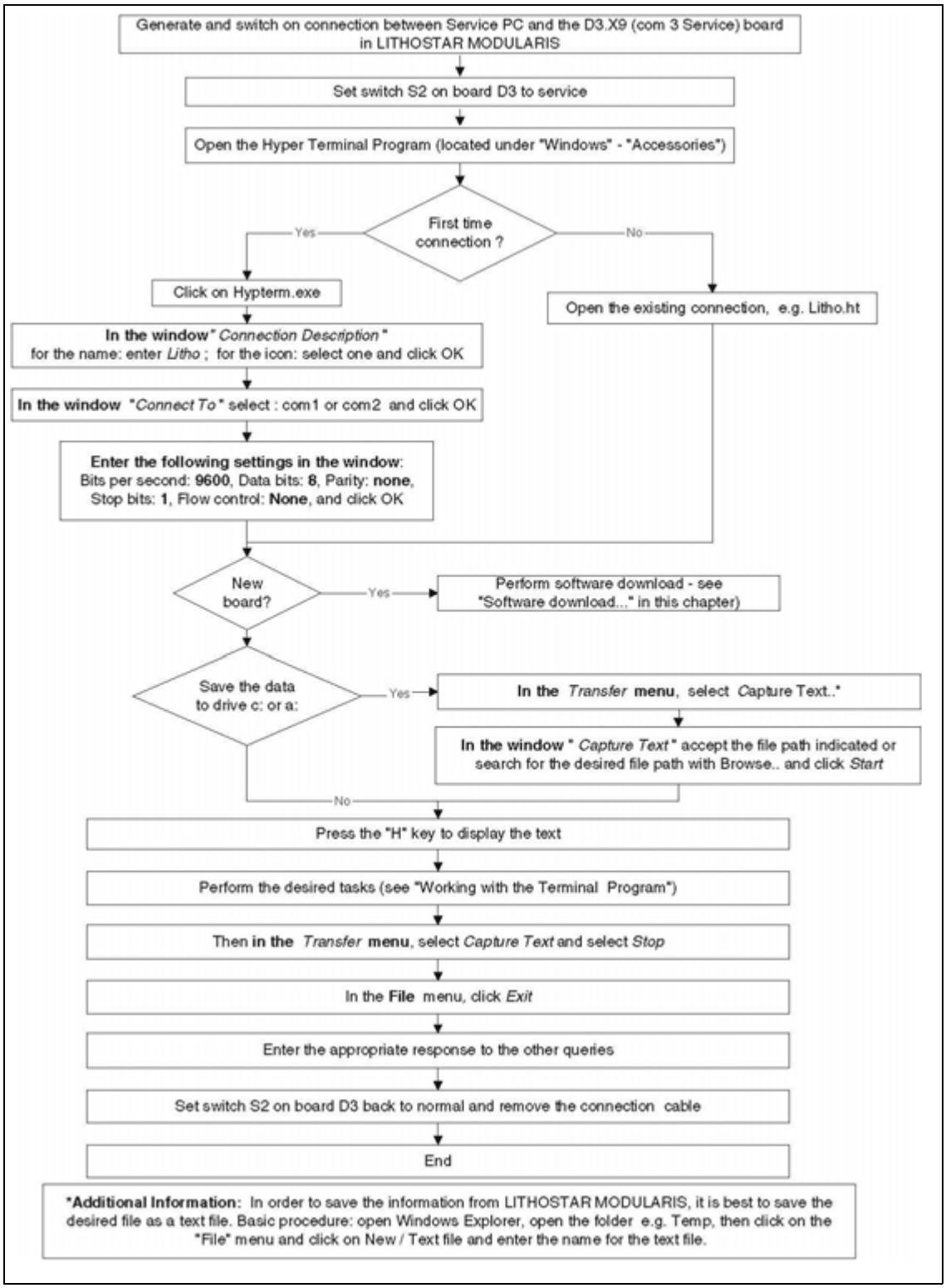

Generate and switch on connection between Service PC and the D3.X9 (com 3 Service) board in LITHOSTAR MODULARIS
Set switch S2 on board D3 to service
Open the Hyper Terminal Program (located under "Windows" - "Accessories")
First time connection ?
Yes
No
Click on Hypterm.exe
Open the existing connection, e.g. Litho.ht
In the window " Connection Description " for the name: enter Litho ; for the icon: select one and click OK
In the window "Connect To " select : com1 or com2 and click OK
Enter the following settings in the window: Bits per second: 9600, Data bits: 8, Parity: none, Stop bits: 1, Flow control: None, and click OK
New board?
Yes
Perform software download - see "Software download..." in this chapter)
Save the data to drive c: or a:
Yes
In the Transfer menu, select Capture Text.."
In the window " Capture Text " accept the file path indicated or search for the desired file path with Browse.. and click Start
No
Press the "H" key to display the text
Perform the desired tasks (see "Working with the Terminal Program")
Then in the Transfer menu, select Capture Text and select Stop
In the File menu, click Exit
Enter the appropriate response to the other queries
Set switch S2 on board D3 back to normal and remove the connection cable
End
*Additional Information: In order to save the information from LITHOSTAR MODULARIS, it is best to save the desired file as a text file. Basic procedure: open Windows Explorer, open the folder e.g. Temp, then click on the "File" menu and click on New / Text file and enter the name for the text file.

*Fig. 5: English_Windows 95_98_NT*

# Working with the (Hyper) Terminal Program

Once you create a connection between the service PC and the LITHOSTAR MODULARIS, press the **"h" key** to display the following text:

You will be notified if the software version is not compatible with the hardware version.

Refer to document SPL1-130.038.01... (Intranet) for default values.

```
   --------------< SIEMENS LITHOSTAR MODULARIS >--------------
 software version: V_ _ _                       hardware:_ _ - _ _

 select option:
 ==============
  h: show this help screen
  p: show pulse counters
  d: show diagnostic data
  e: show error log                      100 errors present
  t: show therapy data
  c: show chipcard data

a/b: adjust c-arm turn-back (a=-, b=+)  now: 1200 ms
  i: install/remove option ECG-trigger  now: not installed
  u: adjust ultrasound localization
  r: set pulse rate                     now: variable 1/1.5/2 Hz
  s: download new software
  o: change orientation of treatment table. Now:   ------   ------
                                                   :     \_/     :
             (X) = Physician's place for       (X) :             :
                   endourolog. therapy             :             :
                                                   ---------------
```

*Fig. 6:*

The following will be displayed if the software version is not compatible with the hardware version:

```
   --------------< SIEMENS LITHOSTAR MODULARIS >--------------
 software version: V_ _ _                       hardware:_ _ - _ _
** Error: software is not compatible with hardware and/or EPLD-version **
** System will not work ! Please download appropriate software.        **

 select option:
 ==============
  h: show this help screen
  p: show pulse counters
      ...
      ...
  o: change orientation of treatment table. Now:   ------   ------
                                                   :     \_/     :
             (X) = Physician's place for       (X) :             :
                   endourolog. therapy             :             :
                                                   ---------------
```

*Fig. 7:*

## Select Option: h

- Press the**"h" key** to display the input menu.

## Select Option: p

- Press the **"p" key** to display the following text:

```
 => P
number of pulses:
     system:           3627
 (1) shock head:       3627
 (2) capacitor:        3627
 (3) spark gap:        3627

select 1..3 to delete pulse counter, any other key to abort
please note values or save to file before deleting data !
```

*Fig. 8:*

The total number of shock waves released are displayed. The counters for the shock head / capacitor / spark gap can be reset to zero.

Always perform this procedure when replacing one of these parts, i. e. the "spark gap" counter must be reset to zero if the charging unit is replaced.

## Select Option: d

Press the **"d" key** to display the following text

```
  ⇨ D
'x'=exit
sensors           HV    P-bellow C-arm poti     US poti1    US poti2
(C-grade)         (V)   (mV         (mV)         (mV)         (mV)
24.15   23.97     20    756         5100         6300         6250
24.21   24.00     20    749         5100         6300         6250
```

*Fig. 9:*

| | |
|---|---|
| Sensors (C-grade) | Displays the temperature at the shock wave head in Celsius. The difference between both temperature values may not exceed a maximum of 3° C. |
| HV (V) | Displays the voltage at the high-voltage capacitor. If there is no connection to the charging unit (i.e. fiber optic cable is removed), the value is 20460. |
| P-bellows (mV) | Displays the pressure in the coupling bellows. P-automatic selected and rinse ended: Q 500 mV - 2000 mV o.k. |
| C-arm pot. (mV) | Current voltage at the potentiometer for the angulation motor. |
| US pot. 1/2 (mV) | Current voltage at the potentiometer for the US applicator. Acceptable difference: 50. When US localization is not available, the value is 9995. |

## Select Option: e

- Press the **"e" key** to display the following text:

```
  => E

no. date       time     err code     100 error messages:
100 02/04/1999 14:43.20 E00:
            .
            .
            .
002 02/04/1999 09:18.36 E70:
001 02/04/1999 09:18.27 E70:
last watchdog-error code: 3F
 -- end of errorlog --

 press key 'D' to delete error log, any other key to abort
 please save error log to file before deleting it !
```

*Fig. 10:*

- The number of errors in the error log is displayed (e.g. 100 error messages).
- The last 250 errors (maximum) are displayed in blocks of 20. Between these blocks is the line "press space to continue, "x" to exit".
- To have a better overview, system power-up is shown with the code E00.
- The oldest error has the number 1; the most recent error is all the way at the top.
- The line "last watchdog error code" is internal information.
- The errors can only be deleted in the system after all error numbers have been viewed.

## Select Option: t

- Press the **"t" key** to display the following text:

```
=> T
available data:
date (m/d/y)   no. of patients
-----------------------------
 03/01/1999     4
 03/02/1999     4
 03/03/1999     3
 03/04/1999     3
 03/05/1999     5
 03/06/1999     5
 03/07/1999     9
 03/12/1999     7

enter 'A' to list all data:    40 patients, approx.   20 kByte of data
    or
enter date of one file to read, press 'space' to stop display
format mm/dd/yyyy (x=exit):
```

*Fig. 11:*

Displays all days for which therapy data exists, as well as the number of patients. To select the day: enter month/day/year.

- The following data is displayed for each treatment (max 40):
  - each increase in energy level
  - the number of shock waves for each of the energy levels (energy levels between 0.1 and 1.0 will be summarized in steps of 0.1)
  - any errors that occurred
  - the text output can be temporarily stopped at any time with the "Space" key.

**Entering "A" is recommended only for saving all data to a diskette**.

The data cannot be deleted until they have been read (on a workday).

Selecting delete will erase **all** therapy data.

```
Content of Therapy log (selected day):

Patient no. 0001  start of therapy: 03/03/1999 17:03.15
---------- table of energy-level (*10) : pulses -----------
 1:0012 ** E60: 32:0041 ** E60:  -:....  -:....  -:....  -:....  -:....  -:....
 -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....
 -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....
 -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....  -:....
End of therapy: 03/03/1999 17:03.24
```

*Fig. 12:*

- Example:
  - 1:0012 - 12 shock waves triggered with an energy step of 0.1-1.0 (energy steps between 0.1 and 1.0 are summarized in intervals of 0.1).
  - **E60 - error 60 has occurred.
  - 32:0041 - 41 shock waves triggered with energy steps of 3.2.
  - **E60 - error 60 has occurred again.

```
---- end of therapy data ----

 press key 'D' to delete all therapy data, any other key to abort

 please save therapy data to file before deleting it !
```

*Fig. 13:*

Once all of the therapy data for a day is listed, the above text will be displayed. Press the **"d" key** to delete all therapy data.

## Select Option: c

- Press the **"c" key** to display the following text:

```
  => C

Card Data:
 # Serial number Type -------< units >--------  eject-date/time    pulse-count
                 GOLD init-cnt  ...   ...                           system
                 PPU  on card   int.  from card
-------------------------------------------------------------------------------
 1:
 2:
 3:53148300000000  G init=2  ....    ....   04/13/1999 15:48.11        418
 4:53149100000001  P  89956     0       0   04/13/1999 16:00.21        418
 5:53148300000000  G init=3  ....    ....   04/13/1999 16:40.51        418
 6:53149100000001  P  84956     0    5000   04/13/1999 17:45.00        418
 7:
 8:
 9:
10:53149100000001  P  84956  5000       0   card locked to unit      ......
 -- end of card data --
```

*Fig. 14:*

| Text: | 4: | 531...0 | G | init=2 | .... | ..... | 04/13 ... | 418 |
|---|---|---|---|---|---|---|---|---|
| Explan.: | *1 | *2 | *3 | *4 | *5 | *6 | *7 | *8 |

- *1: sequential number of the card inserted.
- *2: serial number of the card.
- *3: a "gold" card was inserted, i.e. the input slot is closed.
- *4: init counter in the above example is init=2, i.e. the gold card was logged onto two different D3 boards.
- *5: n.a.
- *6: n.a.:

| | |
|---|---|
| Card ejected | • *7: Date of ejection<br>• *8: System shock wave counter value when card was ejected |
| Card in system | • *7: Text: "Card locked to unit"<br>• *8: ..... |

| Text: | 5: | 531...1 | P | 89956 | 0 | 0 | 04/13 ... | 418 |
|---|---|---|---|---|---|---|---|---|
| Explan.: | *1 | *2 | *3 | *4 | *5 | *6 | *7 | *8 |

- *1: sequential number of the card inserted
- *2: serial number of the card
- *3: a "**p**ay **p**er **u**se" card was inserted
- *4: shock waves still present on the card
- *5: internal system card counter
- *6: number of shock waves registered on inserting the ppu card

| | |
|---|---|
| Card ejected | • *7: Date of ejection<br>• *8: System shock wave counter value when card was ejected |
| Card in system | • *7: Text: "Card locked to unit"<br>• *8: ..... |

## Select Option: a/b

**NOTE** **You do not have to save changes.**

- Press the **"a" key** to reduce the time by 50 ms, i.e. from 1200 ms to 1150 ms.
- Press the **"b" key** to increase the time by 50 ms, i.e. from 1200 ms to 1250 ms.

If there are problems decoupling the angulation motor, the motor follow-up time for relaxing the coupling can be changed. Time < 300 and > 5000 cannot be selected.

## Select Option: i

- Press the **"i" key** to display the following text:

```
=> I
are you sure to install optionECG-trigger ?
press '1' to confirm, any other key to abort
```

*Fig. 15:*

After pressing the "1" key and then the "h" key, the display for "selection option i now "reads": installed".

## Select Option: u

- Press the **"u" key** to display the following text:

```
=> U
---- submenu ultrasound adjust ----

to adjust marker position move applicator onto target
(see service instruction) and press key 'j'

actual value :      _ _ _


 change values for sector applicator - Press key 's'
 change values for convex applicator - Press key 'c'

 press key 'x' to exit
```

*Fig. 16:*

- If the potentiometer has to be adjusted (i.e., after the D3 board is replaced or after the D3 ultrasound addition), proceed as follows:
- Push the probe receiver all the way to the front so that the space between the probe and the isocenter phantom is very small when the isocenter phantom is raised.
- After pressing the "j" key, the following appears after "actual value": established value (max. 500).

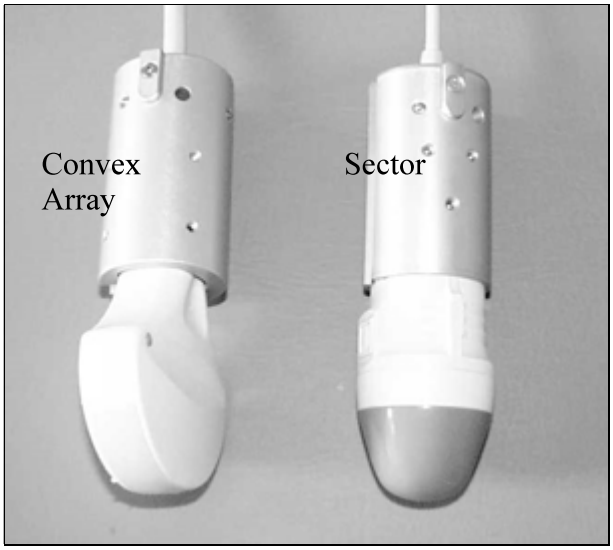



*Fig. 17:*

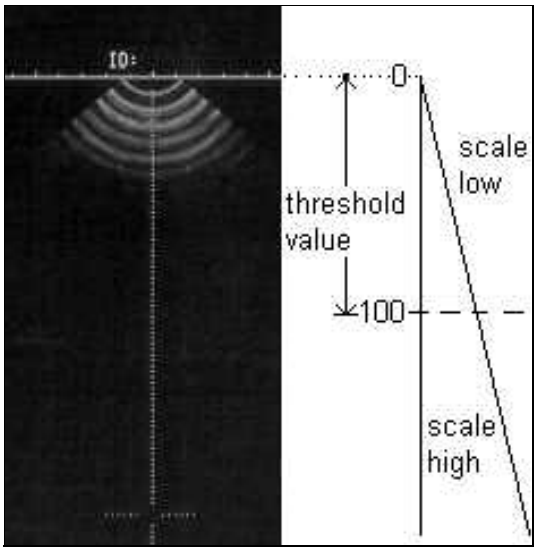



*Fig. 18:*

**⚠CAUTION**

**The following values can be altered only if approval is granted by Erlangen.**

➪ **The correct values can be found in document SPL1-130.038.01... (Intranet).**

```
change values for sector applicator - Press key 's'
change values for convex applicator - Press key 'c'
```

*Fig. 19:*

**Explanation**:

The displayed position (distance and position) of the objects on the ultrasound image is calculated from the time difference between sending a signal and receiving the echo. The standard speed of sound in the human body is 1540 m/sec. However, this speed can vary depending on which tissue is being examined.

The position of the isocenter can be adjusted to ensure that the position of the cross matches the actual stone position on the ultrasound monitor.

This is possible with:

```
          SECTOR APPLICATOR
----------------------------------------
actual values    change with key  (-) (+)
----------------------------------------
threshold value =    100 mm      t    T
scale low       =    7.7 %       l    L
scale high      =    7.7 %       h    H
```

*Fig. 20:*

```
          CONVEX APPLICATOR
----------------------------------------
actual values    change with key  (-) (+)
----------------------------------------
threshold value =    100 mm      t    T
scale low       =    7.7 %       l    L
scale high      =    7.7 %       h    H
```

*Fig. 21:*

Every probe can be set to one of three settings:

| | |
|---|---|
| Threshold value, Fig. 2 | The point at which the "scale high" value is used (default 100 mm). |
| Scale low, Fig. 2 | Correction factor (default 7.7%) between 0 mm and the "threshold value" (this value is useful for thin patients). |
| Scale high, Fig. 2 | Correction factor (default 7.7%) between the "threshold value" and end (this value is useful for obese patients). |

Selecting the keys "t, l, h" (depending on the application) reduces the value. Select T, L, H to increase the value.

## Select option: r

- Press the **"r" key** to change the "pulse rate"
  - Selection: Fixed 2 Hz (USA) or variable 1/1.5/2 Hz
- After pressing the "h" key, display for "selection option r" shows the pulse rate that has been set.

## Select Option: s

**⚠CAUTION** **The system and service PC may not be turned off during a software download.**

➪ **If this occurs, the D3 board must be replaced.**

Software downloads are possible only if the software and hardware are compatible.

- Press the **"s" key** to display the following text:

```
  => S
press key '1' to confirm download, any other key to abort
```

*Fig. 22:*

After "1" has been entered, the software download must start within 60 seconds. If the 60 seconds elapses without starting the download, reselect "h" from the entry menu, reselect "s", etc.

Once the software download is complete, check that the values in the "ultrasound localization" menu for the applicators are identical to those in document SPL1-130.038.01.. (Intranet). If this is not the case, make the appropriate changes.

## Software Download with Windows 95 / 98 / NT

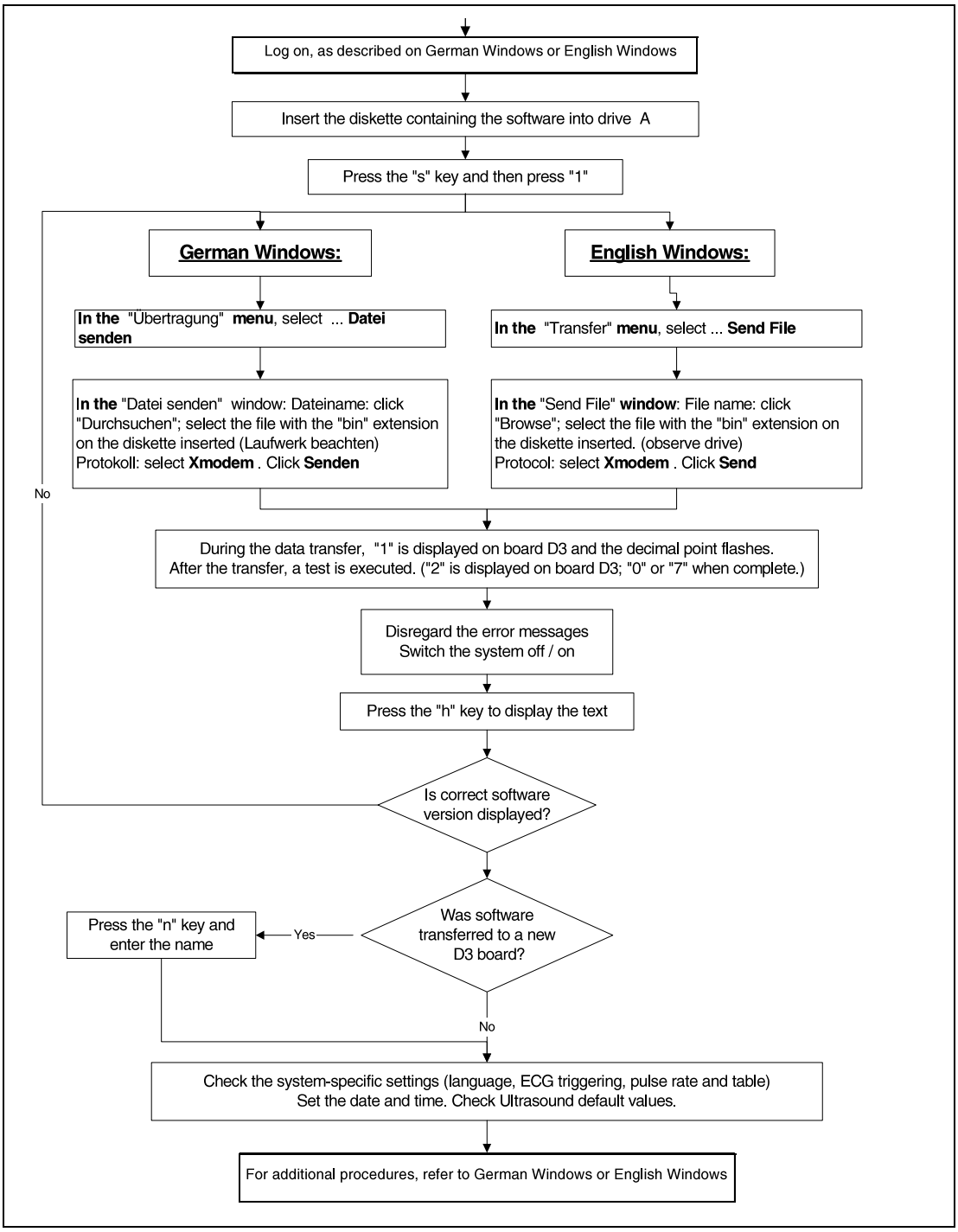

Log on, as described on German Windows or English Windows
Insert the diskette containing the software into drive A
Press the "s" key and then press "1"
German Windows:
English Windows:
In the "Übertragung" menu, select ... Datei senden
In the "Transfer" menu, select ... Send File
In the "Datei senden" window: Dateiname: click "Durchsuchen"; select the file with the "bin" extension on the diskette inserted (Laufwerk beachten) Protokoll: select Xmodem . Click Senden
In the "Send File" window: File name: click "Browse"; select the file with the "bin" extension on the diskette inserted. (observe drive) Protocol: select Xmodem . Click Send
No
During the data transfer, "1" is displayed on board D3 and the decimal point flashes. After the transfer, a test is executed. ("2" is displayed on board D3; "0" or "7" when complete.)
Disregard the error messages Switch the system off / on
Press the "h" key to display the text
Is correct software version displayed?
Press the "n" key and enter the name
Yes
Was software transferred to a new D3 board?
No
Check the system-specific settings (language, ECG triggering, pulse rate and table) Set the date and time. Check Ultrasound default values.
For additional procedures, refer to German Windows or English Windows

*Fig. 23: Software Download with Windows 95_98_NT*

Do not select `"capture text file"` when downloading the software.

## Select Option: 0

- Press the **"o" key** to switch from the right side to the left side of the table. This may be done only if the table has also been mechanically modified, refer to MODULARIS Uro Installation and Startup Instructions. After pressing the "h" key, the display for "option o selection" will show which table was selected. The configuration shipped is the right table (Fig. 25 / p. 44).

Left table

```
o: change orientation of treatment table. Now:    ------    ------
                                                  :     \_/      :
            (X) = Physician's place for           :              : (X)
                  endourolog. therapy             :              :
                                                     ----------
```

Right table

```
o: change orientation of treatment table. Now:    ------    ------
                                                  :     \_/      :
            (X) = Physician's place for       (X) :              :
                  endourolog. therapy             :              :
                                                     ----------
```

*Fig. 24:*

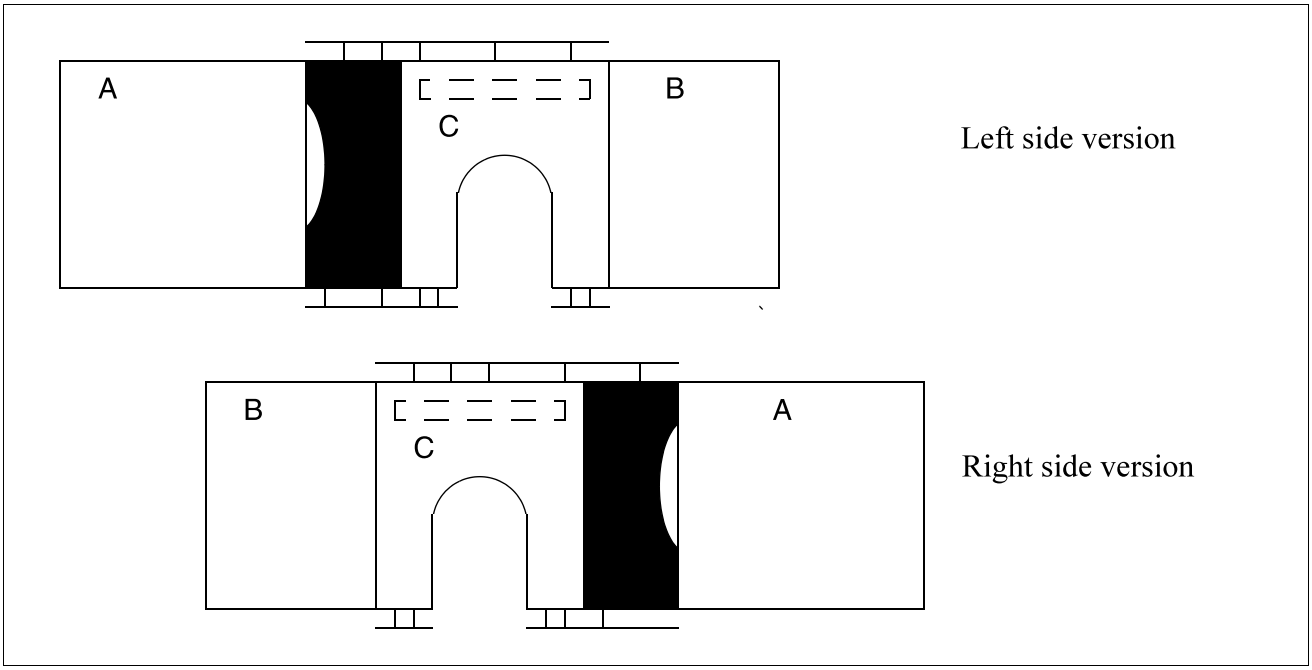



*Fig. 25: Left/right side version*

## Text after Replacing the D3 Board

- Press the **"h" key** to display the following text (the software is installed).

```
   --------------<   xxxxxxx   Lithomodule     >--------------
    ------------------------------------------
      n: select system name before shipping !
    ------------------------------------------
 software version: V_ _ _                        hardware:_ _ - _ _

 select option:
 ==============
  h: show this help screen
  p: show pulse counters
      ...
      ...
      ...
  o: change orientation of treatment table. Now:    ------   ------
                                                    :     \_/     :
             (X) = Physician's place for       (X)  :             :
                   endourolog. therapy              :             :
                                                    ---------------
```

*Fig. 26:*

- Press the **"n" key** to display the following text.

```
  => N
select number to define system name:
  1: SIEMENS
  2: OEM-customer
```

*Fig. 27:*

- Press 1 or 2 and follow the instructions.

```
you selected: SIEMENS
press 'C' to confirm, any other key to abort
SIEMENS
```

*Fig. 28:*

| NOTE | **This procedure cannot be undone!** |
|---|---|

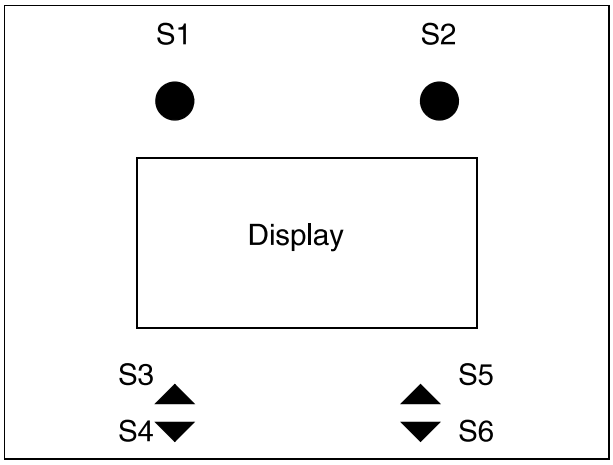



*Fig. 29:*

# LITHOSTAR MODULARIS Control Panel

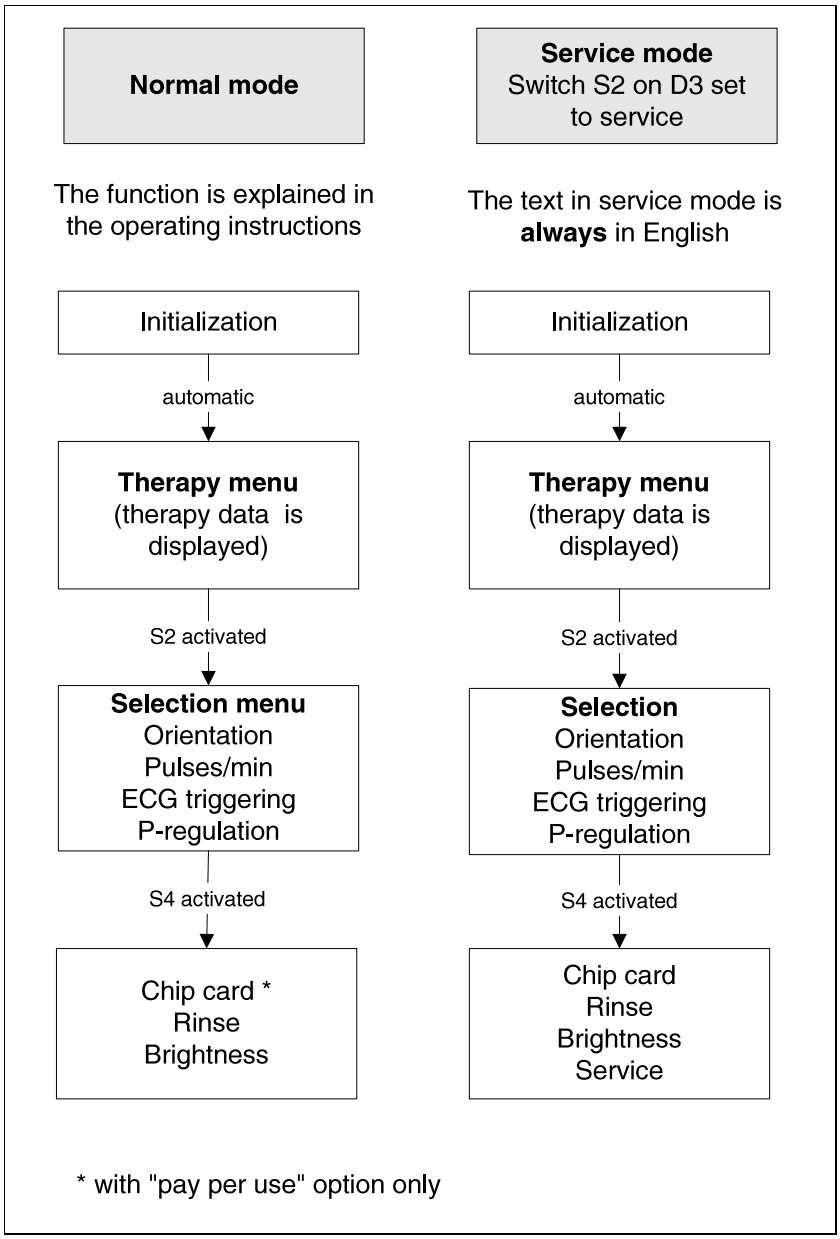



*Fig. 30:*

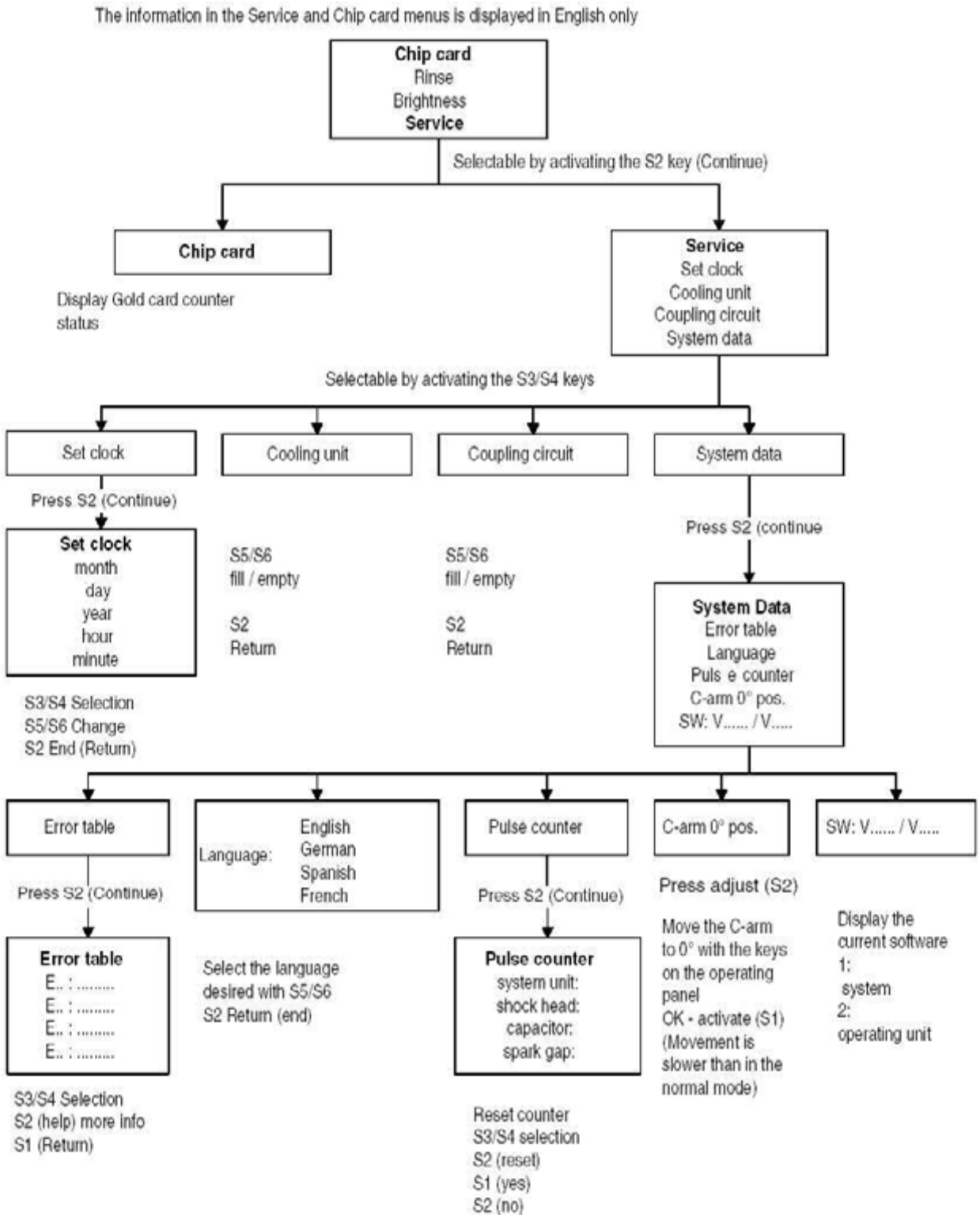

The information in the Service and Chip card menus is displayed in English only
Chip card
Rinse
Brightness
Service
Selectable by activating the S2 key (Continue)
Chip card
Display Gold card counter status
Service
Set clock
Cooling unit
Coupling circuit
System data
Selectable by activating the S3/S4 keys
Set clock
Cooling unit
Coupling circuit
System data
Press S2 (Continue)
Set clock
month
day
year
hour
minute
S3/S4 Selection
S5/S6 Change
S2 End (Return)
S5/S6
fill / empty
S2
Return
S5/S6
fill / empty
S2
Return
Press S2 (continue
System Data
Error table
Language
Puls e counter
C-arm 0° pos.
SW: V..... / V.....
Error table
Language:
English
German
Spanish
French
Pulse counter
C-arm 0° pos.
SW: V..... / V.....
Press S2 (Continue)
Error table
E.. : .....
E.. : .....
E.. : .....
E.. : .....
S3/S4 Selection
S2 (help) more info
S1 (Return)
Select the language desired with S5/S6
S2 Return (end)
Press S2 (Continue)
Pulse counter
system unit:
shock head:
capacitor:
spark gap:
Reset counter
S3/S4 selection
S2 (reset)
S1 (yes)
S2 (no)
Press adjust (S2)
Move the C-arm to 0° with the keys on the operating panel
OK - activate (S1)
(Movement is slower than in the normal mode)
Display the current software
1:
system
2:
operating unit

*Fig. 31:*

# LITHOSTAR MODULARIS Parts Overview

| Assembly | | Comments Regarding Replacement |
|---|---|---|
| **Function** | **Item No.** | |
| Shock wave head **C** | 16 11 008 | Refer to description: Replace the Water, Also Replace the M1 Pump Head, Reset the Counter to Zero<br>The shock wave head is shipped without the coupling bellows |
| Coupling bellows **C** | 47 78 705 | The clamping strap must be ordered separately! |
| Shock wave head **C plus** | 70 41 358 | Refer to description: Replace the Water, Also Replace the M1 Pump Head, Reset the Counter to Zero<br>The shock wave head is shipped without the coupling bellows |
| Coupling bellows **C plus** | 70 41 416 | The clamping strap must be ordered separately! |
| High voltage cable | 11 81 523 | Refer to description, "Cables in Corrugated Tubing" |
| High voltage connector | 11 81 622 | Refer to description, |
| Charging Unit | 11 58 000 | Refer to description, |
| Cooling Unit | 47 78 002 | Refer to description, Filling in the "Dates in the Startup" box. |
| Pump | 47 73 847<br>70 41 101 | Coupling pump; Refer to description, Cooling Pump; Refer to description, |
| Temperature Sensor | 55 31 277 | Refer to description, "Cables in Corrugated Tubing" |
| Pressure Sensor | 55 31 243 | Refer to description, "Cables in Corrugated Tubing" |
| D3 Board | 55 31 053 | Refer to description, |
| Battery for D3 Board | 31 46 073 | |
| Control Unit | 55 31 129 | No special instructions required<br>Perform a function test following replacement |
| Transformer and D1 Board | 55 31 111 | Make a note of the jumpers for the line voltage<br>230 V: 3 -5, 200V: 2 - 6, 120 V:1 - 5 and 4 - 7, 100 V: 1 -6 and 2 - 7 |
| D1 Power Supply Board | 55 31 301 | Check fuses |

| | | |
|---|---|---|
| Angulation motor | 55 31 392 | Refer to description, |
| MODULARIS Support Arm | 55 31 020 | Refer to description, |
| Articulated Joint Lock | 55 31 608 | Refer to description, |
| Potentiometer | 70 50 433 | Refer to description, |
| SIREMOBIL Switch | 10 70 721 | Refer to description, |
| CPL Adjustment Adapter.<br>Isocenter Phantom | 47 78 754 | **Version A** usable for C-head only<br>**As of version B** adaptable for **C** and **C plus** |

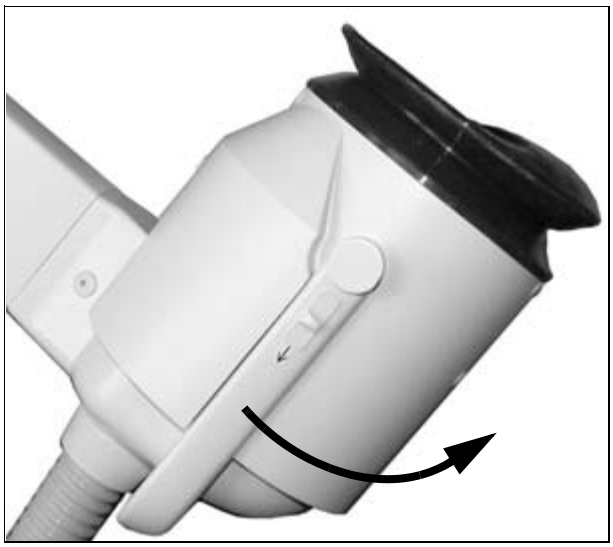


*Fig. 32: Parking the phantom*

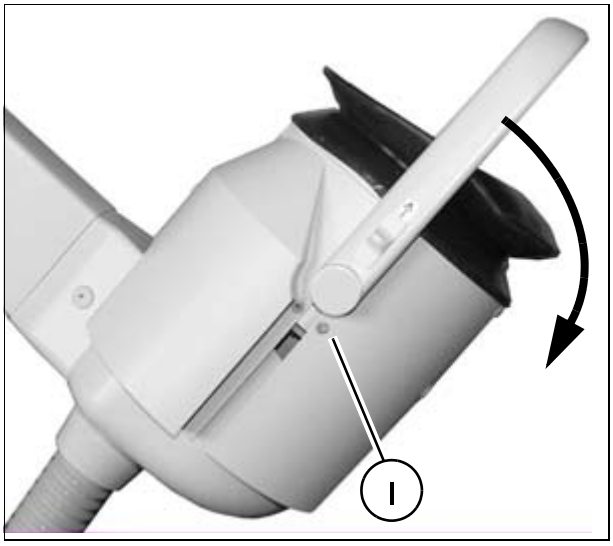



*Fig. 33: Phantom work*

# Shock Wave Head

## Shock Wave Head Cover Panels

- Switch the system off. Remove the cover panels on the system unit by removing the screws.
- Remove the water reservoir tank and drain the remaining water.
- Reinstall the water reservoir tank.
- Switch the system on. Position the support arm in the horizontal position.
- Set S2 service switch on the D3 board to position 2 (service on).
- Select "service" on the control unit and then "coupling circuit".
- Press the corresponding key for "empty" (S6) on the control unit until the coupling bellows is located next to the lens.
- Switch the system off.
- Only the equipment with ultrasound localization:
  - Unscrew the two placement parts for the ultrasound.
  - Ensure that the screw lengths are correct when tightening them.
- Remove the mounting screws (I/Fig. 33 / p. 50) for the upper cover panel on both sides of the shock head.
- Push the buttons in the direction of the arrow on both sides of the isocenter phantom (Fig. 33 / p. 50) and at the same time flip back the isocenter phantom (Fig. 32 / p. 50).
- Detach the upper cover panel, remove it towards the front.
- Push the buttons on both sides of the isocenter phantom in the direction of the arrow (Fig. 32 / p. 50) and at the same time flip up the isocenter phantom (Fig. 33 / p. 50).
- If required, remove the 3 paneling screws from both lower cover panels and remove the cover panels.
- Reinstall the cover panels in the reverse order after completion of all work.

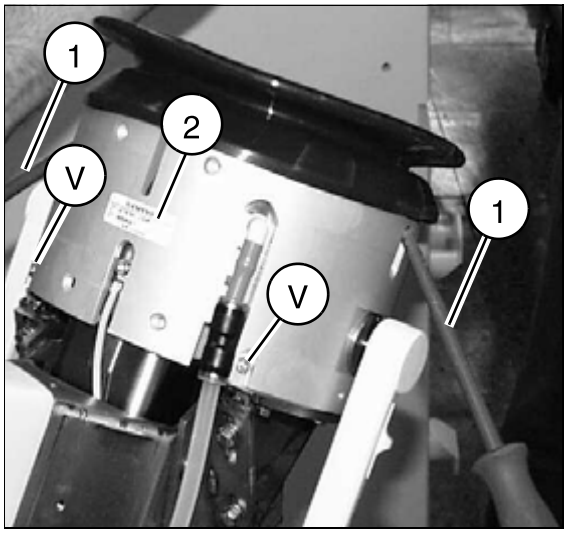



*Fig. 34: Removing swh*

*Fig. 35: swh socket*

## Removing the Shock Wave Head

| | | |
|---|---|---|
| System configuration n = several | 1 LITHOSTAR MODULARIS and 1 SIREMOBIL Iso-C | 1 LITHOSTAR MODULARIS and n SIREMOBIL Iso-C |
| Replace the shock wave head | Up to support arm S0050<br>For adjustment of isocenter on the shock wave head; refer to chapter "Isocenter with X-ray, up to Support Arm Serial Number 0050". | **It is important to follow this work flow to avoid having to readjust the isocenter on all SIREMOBILEs!**<br>• Prior to replacing the shock wave head, view the isocenter (the three C-Arm positions) and if possible, save it or make a hardcopy.<br>• Replace the shock wave head.<br>• Check the isocenter; the setting must be identical to that of the defective shock wave head. If an adjustment is necessary, it must be made using the shock wave head setting; refer to chapter "Isocenter with X-ray, up to Support Arm Serial Number 0050". |
| | Beginning with Support Arm S0051<br>For adjustment of isocenter on the SIREMOBIL Iso-C; refer to chapter "Isocenter with X-ray, beginning with Support Arm Serial Number 0051". | |

- Remove the cover panels on the shock wave head (refer to "Shock Wave Head Cover Panels").
- Remove the coupling bellows, carefully pulling the small pin out of the air suction hose inside the coupling bellows (refer also to (Fig. 39 / p. 55) and (Fig. 40 / p. 55)).
- Loosen the four screws (V/Fig. 34 / p. 51) on the isocenter phantom using an Allen key with a ball end, but do not remove them.

- Flip the isocenter phantom toward the front and completely remove it (this may be difficult).
  - If the isocenter phantom has a serial number (2/Fig. 34 / p. 51), it can be removed by using two screw pulleys (1/Fig. 34 / p. 51) on the shock wave head.
- Open the Y8 valve (Fig. 42 / p. 58), i.e. switch the Y8 lever from horizontal = closed, to vertical = open.
- Switch the system on.
- Set the S2 service switch on the D3 board to position 2 (service on).
- Select "service" on the control unit and then "cooling unit".
- Press the corresponding key for "empty" on the control unit until no more water flows out.
- Set the S2 service switch on the D3 board to position 1 (service off).
- Switch the system off.
- Remove the 2 Allen screws (U/Fig. 35 / p. 52) underneath the shock wave head.
- Remove the screw (SL/Fig. 38 / p. 54) with the ground wire on the shock wave head.
- **Wait at least 10 minutes after switching the system off. Then push the high-voltage connector down until the openings** (O/Fig. 38 / p. 54) **are accessible**.
- Loosen the Allen screws in the openings (O/Fig. 38 / p. 54), but do not remove them.
- Disconnect all the water hoses at both interfaces of the shock wave head.
- Remove the shock wave head towards the front.

| NOTE | **There may be water remaining in the shock wave head.** |
|---|---|

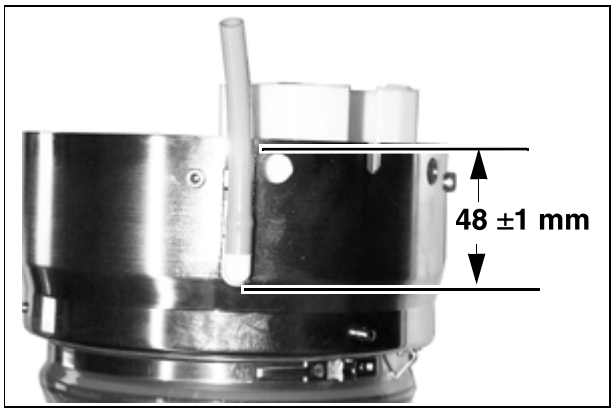



*Fig. 36: swh tube*

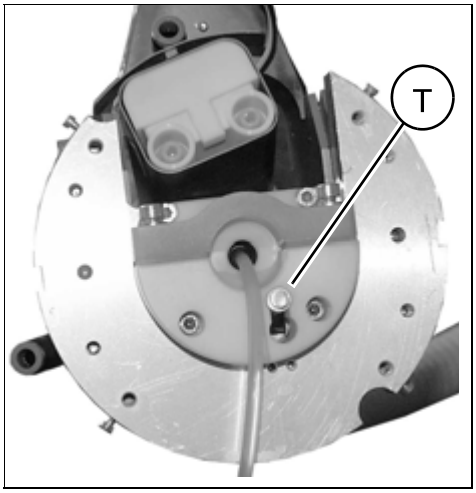



*Fig. 37: swh sensor*

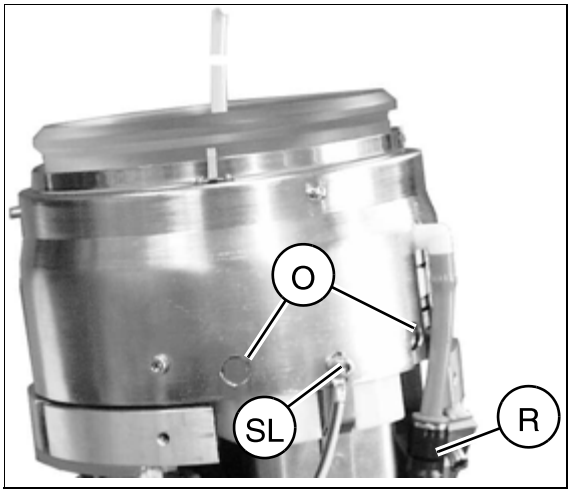



*Fig. 38: swh adjustment*

## Installing the Shock Wave Head

- Shorten both hoses at the shock wave head corresponding to the dimensions in (Fig. 36 / p. 53).
- Check that the spring-mounted temperature sensor (T/Fig. 37 / p. 54) is seated correctly in the groove.
- Insert the air suction hose centrally through the shock wave head (L/Fig. 40 / p. 55).
- Install the new shock wave head from above and insert the water hoses; when doing this, ensure that **the hose marked in red** (R/Fig. 38 / p. 54) is located next to the high-voltage connector and that the air suction hose underneath the shock wave head is neither kinked nor caught in the shock wave head.
- Attach the shock wave head with the Allen screws (O/Fig. 38 / p. 54) that are visible through the opening.
- Push the high-voltage connector as far up as possible until the openings (O/Fig. 38 / p. 54) are covered again.
- Reattach the screw (SL/Fig. 38 / p. 54) with the ground wire.

- Retighten the 2 Allen screws (U/Fig. 35 / p. 52) underneath the shock wave head.
- Place the isocenter phantom on top so that it is flush and secure it with the four screws (V/Fig. 34 / p. 51) (use an Allen key with a ball end for this).

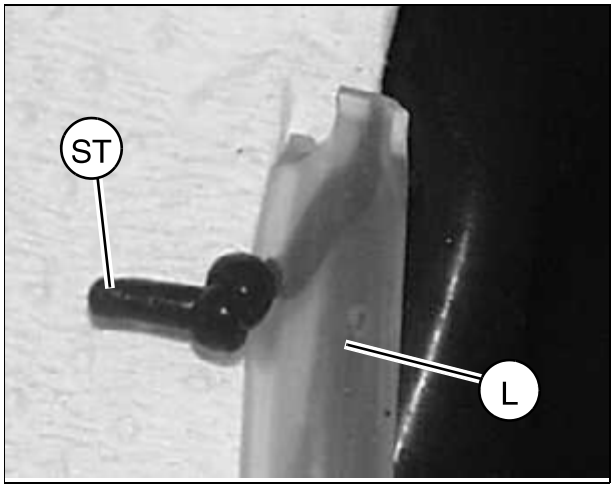



*Fig. 39: swh air*

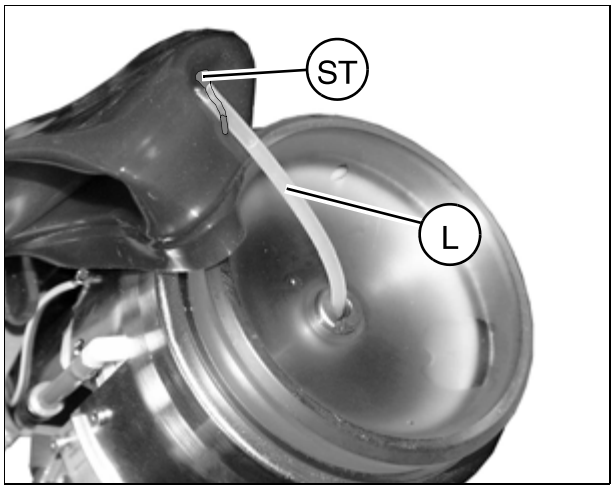



*Fig. 40: swh air tube*

- Insert the air suction hose (L) as shown in (Fig. 39 / p. 55) and (Fig. 40 / p. 55) carefully over the pin (ST) in the coupling bellows. Tie a knot to secure it (Fig. 39 / p. 55).
- Install the coupling bellows; when doing this, ensure that the pin (ST/Fig. 40 / p. 55) for attachment of the hose is positioned at the highest point and is seated correctly in the clamp.
- Replace the hose pump head for cooling pump M1 (refer to the section "Hose Pump Head in the Coupling System"). (Not necessary if the IWAKI pump is installed).
- Fill the cooling system (refer to the section "Filling the Cooling System").
- Fill the coupling system (refer to the section "Filling the Coupling System").
- Check the isocenter as described in (Isocenter with X-Ray / p. 97).
- Select "service" and then "coupling system" on the control unit.
- Activate the corresponding key for "empty" (S6) on the control unit until the coupling bellows is located next to the lens.
- Reinstall the covers of the shock wave head according to the procedure for removal.

- Adjust the S2 service switch on the D3 board to position 1 (service off).
- Select "rinse" on the control unit and activate the cycle (ends automatically).
- Read out the counter for the shock wave head and record the value in the Operating Protocol (in Register 4).
- Reset the counter (Service Software / p. 31).
- Connect the service PC to the board as described in (Service Software / p. 31).
- Read out both temperature values on the service PC; the difference may not exceed a maximum of 3° C.
- Trigger shock waves: both temperature values should increase closely in parallel (DT e 3° C).
- Reattach the system cover.
- Perform a function test.

## Replacing the Isocenter Phantom

| System configuration n = several | 1 LITHOSTAR MODULARIS and 1 SIREMOBIL Iso-C | 1 LITHOSTAR MODULARIS and n SIREMOBIL Iso-C |
|---|---|---|
| Replace the isocenter phantom | Up to support arm S0050<br>For adjustment of isocenter on the shock wave head, refer to chapter (LITHOSTAR MODULARIS up to Support Arm Serial Number 0050 / p. 97) | **It is important to follow this work flow to avoid having to readjust the isocenter on all SIREMOBILEs!**<br>• Prior to replacing the isocenter phantom, view the isocenter (the three C-Arm positions) and if possible, save it or make a hardcopy.<br>• Replace the isocenter phantom.<br>• Check isocenter; the setting must be identical to that of the defective isocenter phantom. If an adjustment is necessary, it must be made via the shock wave head setting; refer to chapter (LITHOSTAR MODULARIS up to Support Arm Serial Number 0050 / p. 97). |
| | Beginning with support arm S0051<br>For adjustment of isocenter on the SIREMOBIL Iso-C, refer to chapter (LITHOSTAR MODULARIS beginning with Support Arm Serial Number 0051 / p. 103). | |

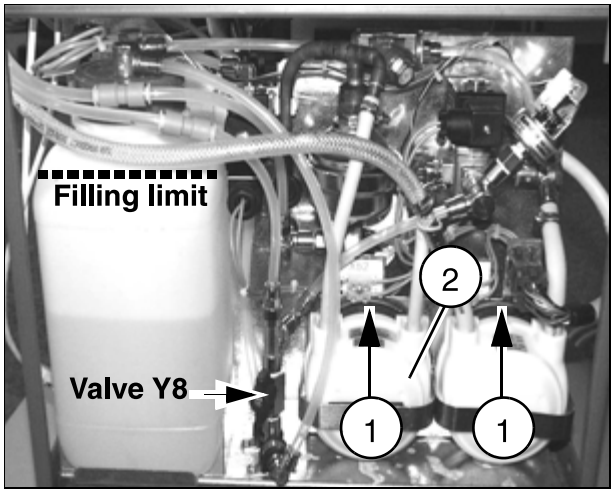



*Fig. 41: Old pump*

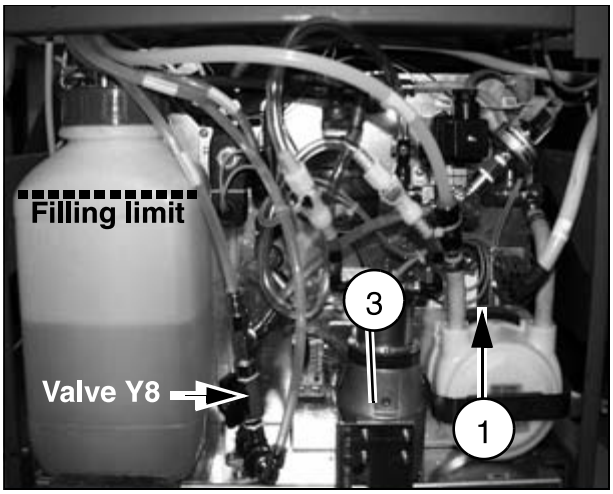



*Fig. 42: New pump*

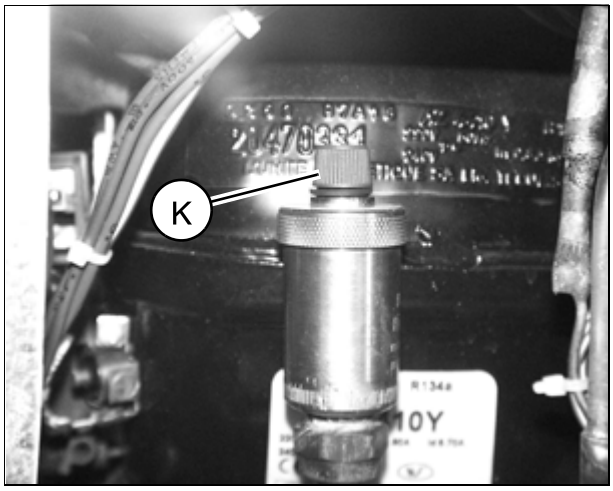



*Fig. 43: Bleeder valve*

# Cooling Unit

## Checking the Cooling Unit

- Disconnect both cables at the B1 temperature switch (located on the cooling unit underneath the D3 board and the fiber optic connections).
- Connect both cables.
- Switch the system on.
- The fan and compressor in the cooling unit start up.
  - If not, check the power supply.
  - If o.k., replace the cooling unit.
- Switch the system off.
- Reconnect both cables.

## Replacing the Cooling Unit

- Empty the coupling system and cooling system according to the instructions.
- Replace the cooling unit.
- Fill the coupling system and cooling system according to the instructions.
- Fill in the "Date of start up" box on the cooling unit label.

## Filling the Cooling System

- Remove the system cover panels.
- Fill the water reservoir tank with distilled water.
- Switch the system on.
- Position the support arm in the horizontal position.
- Open the bleeder valve (cap K/Fig. 43 / p. 58) in the cooling unit by two turns (it should remain open).
- Adjust the S2 service switch on the D3 board to position 2 (service on).
- Open the Y8 valve (Fig. 41 / p. 57) / (Fig. 42 / p. 58); i.e. switch the Y8 lever from horizontal = closed to vertical = open.
- Select "service" on the control unit and then "cooling unit".
- Press the corresponding key for "fill" on the control unit until the water flowing from the return line in the water reservoir tank is free of air bubbles. (the M1 hose pump will run as long as required, V188 on the D3 board goes on).
- Close the Y8 valve (Fig. 41 / p. 57) / (Fig. 42 / p. 58); i.e. switch the Y8 lever from vertical - open to horizontal = closed.
- Set the S2 service switch on the D3 board to position 1 (service off).
- Switch the system off.
- Reattach the system cover panels.

## Filling the Coupling System

- Remove the system cover panels.
- Fill the water reservoir tank with distilled water, if necessary.
- Switch the system on and position the support arm in the horizontal position
- Set the S2 service switch on the D3 board to position 2 (service on).
- Select "service" on the control unit and then "coupling system".
- Press the corresponding key for "fill" (S6) on the control unit until the coupling bellows rounds out slightly.
- Check whether the air suction hose inside the coupling bellows is actually secured at the top position (Installing the Shock Wave Head / p. 54) (Fig. 39 / p. 55).
- Set the S2 service switch on the D3 board to position 1 (service off).
- Select "rinse" on the control unit and activate the cycle; this function ends automatically.
- If air bubbles are visible in the coupling bellows, start the "rinse" cycle again.
- Switch the S2 service switch on the D3 board to position 2 (service on).
- Select "service" and then "coupling system" on the control unit.
- Press the corresponding key for "empty" (S6/Fig. 33 / p. 50) on the control unit until the coupling bellows is located next to the lens.
- Switch the system off.
- Fill the water reservoir tank up to the fill line (Fig. 41 / p. 57) / (Fig. 42 / p. 58) with distilled water.
- Set the S2 service switch on the D3 board to position 1 (service off).
- Switch the system on. The "rinse" cycle will be activated automatically and the coupling bellows will fill.
- Switch the system off.
- Fill the water reservoir tank with distilled water.
- Reattach the system cover panels.

## Emptying the Cooling System with the Old Pump (2/Fig. 10)

- Remove the system cover panels.
- Remove the water reservoir tank and empty the water.
- Insert the return hose into the water reservoir tank.
- Position the support arm in the horizontal position.
- Open the Y8 valve (Fig. 41 / p. 57), i.e. switch the Y8 lever from horizontal = closed to vertical = open.
- Switch the system on.
- Set the S2 service switch on the D3 board to position 2 (service on).
- Select "service" on the control unit and then "cooling unit".
- Press the corresponding key for "empty" on the control unit until no more water flows.
- Set the S2 service switch on the D3 board to position 1 (service off).

- Switch the system off.

## Emptying the Cooling system with the New Pump

(3/Fig. 42 / p. 58)

- Remove the system cover panels from the basic unit.
- Remove the water reservoir tank and empty the water.
- Insert the return hose into the water reservoir tank.
- Position the support arm in the horizontal position.
- Open the Y8 valve (Fig. 42 / p. 58), i.e. switch the Y8 lever from horizontal = closed to vertical = open.
- Exchange the two water connections on the cooling pump. (The two black-marked hoses are not connected).
- Switch the system on.
- Set the S2 service switch on the D3 board to position 2 (service on).
- Select "service" and then "cooling unit" on the control unit.
- Press the corresponding key for "empty" on the control unit until the water stops.
- Set the service switch on the D3 board to position 2 (service off).
- Switch the system off.
- Properly connect the two water connections to the cooling pump. (Both black-marked hoses must be reconnected).

## Emptying the Coupling System

- Remove the system cover panels on the basic unit.
- Remove the water reservoir tank and empty the water.
- Switch the system on.
- Position the support arm in the horizontal position.
- Set the S2 service switch on the D3 board to position 2 (service on).
- Select "service" and then "coupling system" on the control unit.
- Press the corresponding key for "empty" (S6) on the control unit until the coupling bellows is located next to the lens.
- Switch the system off.

# Hose Pump Head in the Coupling System

## Removing the Hose Pump Head

- Remove the system cover panels and the cover of the shock wave head.
- Empty the coupling system (refer to the section "Emptying the Coupling System").
- Switch the system off.
- Remove the safety latch on the hose pump head.
- Press the black latch (1/Fig. 41 / p. 57) / (1/Fig. 42 / p. 58) up or down and remove the hose pump head from the drive.
- Open the 2 hose clamps and remove the hoses.
- Remove the hose pump head.

## Installing the Hose Pump Head

- Place the hose pump head on the drive shaft and lock it into place.
- Reconnect the 2 hoses with the hose clamps. Ensure that the hoses are the correct length, i.e. cut them to the same length as the old hoses.
- Fill the coupling system (refer to "Filling the Coupling System").

# Hose Pump Head in the Cooling System

## Removing the Hose Pump Head

- Switch the system off.
- Open the system cover panel.
- Empty the cooling system (refer to the section "Emptying the Cooling System").
- Remove the safety latch on the hose pump head.
- Press the black latch (1/Fig. 41 / p. 57) down or up and remove the hose pump head from the drive.
- Open the 2 hose clamps and disconnect the hoses.
- Remove the hose pump head.

## Installing the Hose Pump Head

- Place the hose pump head on the drive shaft and latch it into position.
- Reconnect the 2 hoses with the hose clamps. Ensure that the hoses are the correct length, i.e. cut them to the same length as the old hoses.
- Fill the cooling system (refer to the section "Filling the Cooling System").

# IWAKI Cooling Pump

## Removal

- Switch the system off.
- Open the system cover panel.
- Remove the fasteners on the pump.
- Remove the motor connections on the terminal block.
- Loosen the screws to remove the pump.

## Installation

- Install the pump.
- Connect the motor connections.
- Connect the fasteners on the pump (The black-marked water hoses must be connected).
- Fill the cooling system (refer to the section "Filling the Cooling System").

## Charging Unit

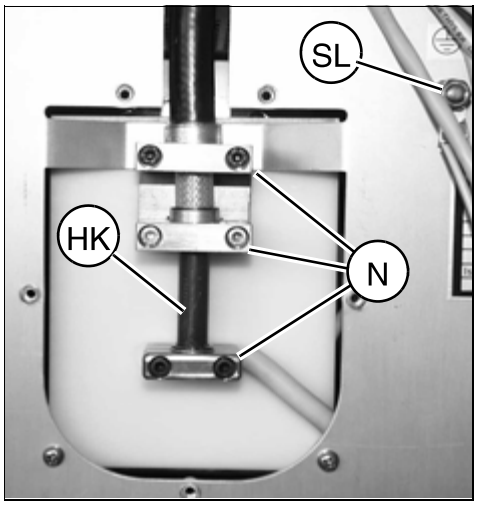



*Fig. 44: HV connection*

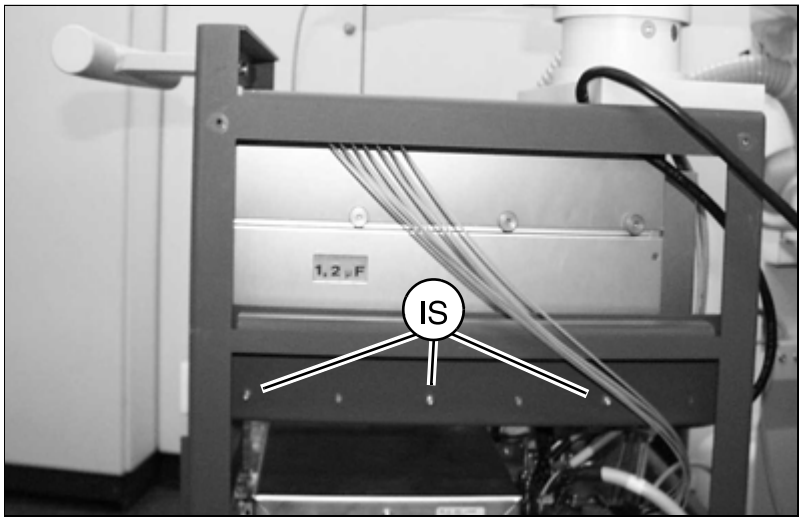



*Fig. 45: Charger mount*

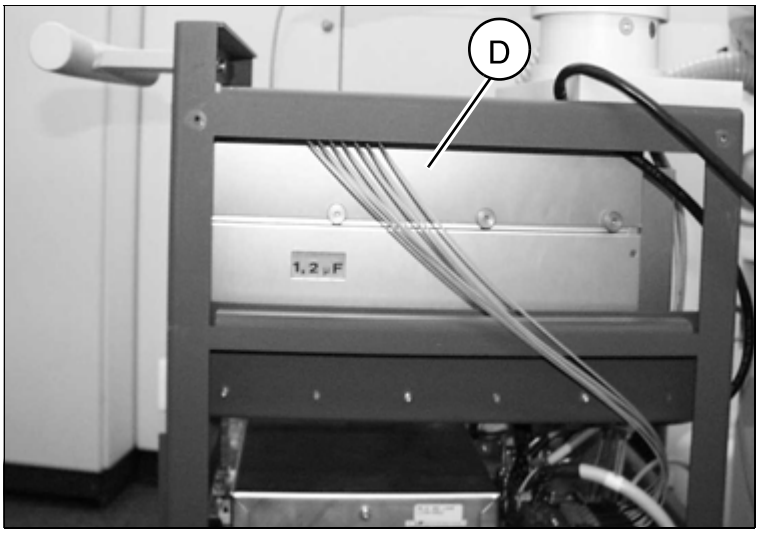



*Fig. 46: Fiber optic cable*

- Switch the system off and disconnect the power connector.
- Remove the cover panels (of the basic system unit).
- Disconnect the charging unit power cable.
- **Wait at least 10 minutes after switching the system off. Then remove the cover on the back high-voltage cable connection** (Fig. 44 / p. 65).
- Remove the high voltage cable (HK/Fig. 44 / p. 65) and the ground wire (SL/Fig. 44 / p. 65) by removing the screws.
- Remove the fiber optic cable from the charging unit.
- Remove the six Allen screws (IS/Fig. 45 / p. 65) (three on each side, right and left).
- Remove the old charging unit from the basic system unit and install the new one.
- Reattach the six Allen screws (IS/Fig. 45 / p. 65) and tighten them (three on each side, right and left).
- Reconnect the fiber optic cable to the charging unit (check for correct connections).
- Reattach the ground wire and the high-voltage cable with the screws (Fig. 44 / p. 65).
- Reattach the cover on the high-voltage cable connection.
- Reconnect the power cable of the charging unit.
- Record the installation date on the charging unit (next to the capacitor).
- Switch the system on.
- Read out the counters for the charging unit and the spark gap and record the values on the old charging unit.
- Reset the counter (Service Software / p. 31).
- Perform a function test.
- Switch the system off and reattach the system cover panel.

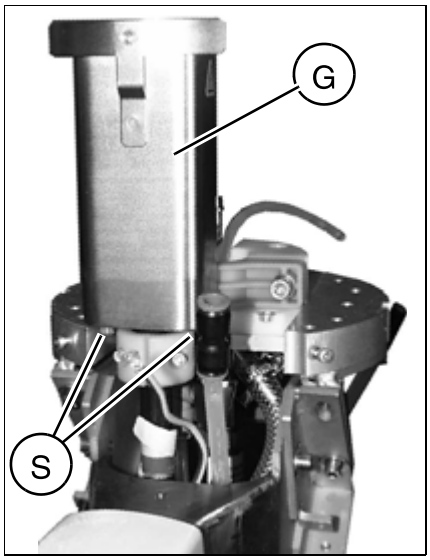



*Fig. 47: HV connector*

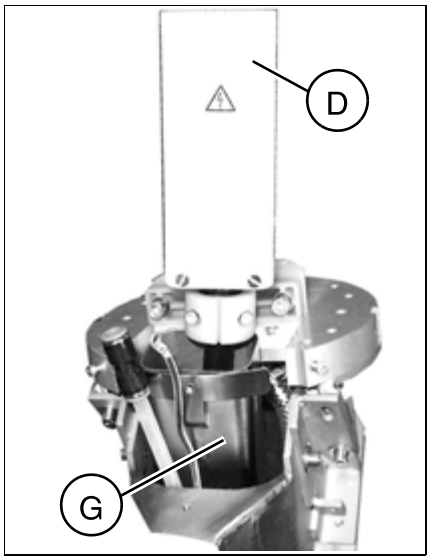



*Fig. 48: HV connector opening*

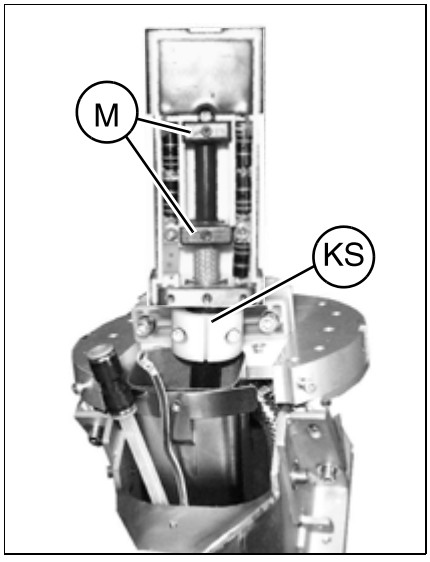


*Fig. 49: Replacing the HV cables*

## High Voltage Connector

- Remove the cover panels of the basic system unit and the shock wave head.
- Remove the shock wave head (refer to the corresponding section).
- Remove the cover at the charging unit above the high-voltage connection by removing the screws (Fig. 44 / p. 65).
- Remove the three clamps (N/Fig. 44 / p. 65) on the high-voltage connection.
- Push the high voltage cable (HK/Fig. 44 / p. 65) in the direction of the shock wave head through the corrugated tubing until the high-voltage connector is accessible (Fig. 47 / p. 67).
- Remove the screws (S/Fig. 47 / p. 67) on the high voltage connector.
- Push the metal housing (G/Fig. 48 / p. 67) above the high-voltage plug toward the back.
- Open the cover (D/Fig. 48 / p. 67) of the high-voltage connector.
- Remove the connection clamps (M/Fig. 49 / p. 68) in the old high-voltage connector.
- Open the cable clamps (KS/Fig. 49 / p. 68) of the high-voltage connector.
- Connect the new high-voltage connector; reconnect and secure it in the reverse order of removal.
- Push the high-voltage cable back in the direction of the charging unit (in the basic unit) and connect it (Fig. 44 / p. 65).
- Install the shock wave head assembly (refer to the corresponding section).
- Attach all cover panels (refer to the corresponding sections).

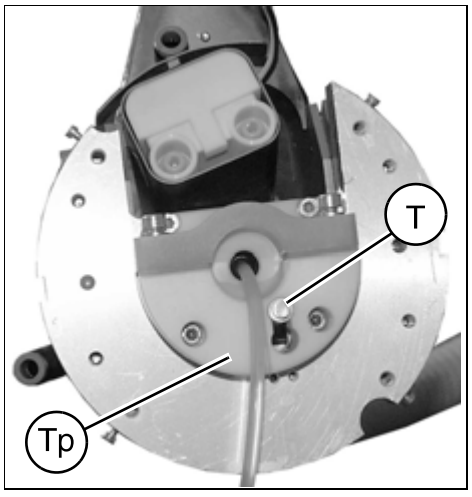



*Fig. 50: Removing the C body*

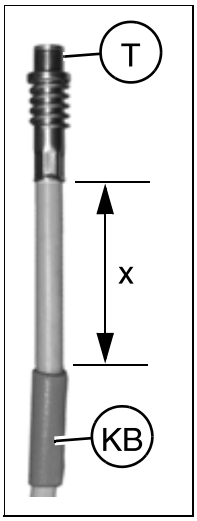



*Fig. 51: Sensor*

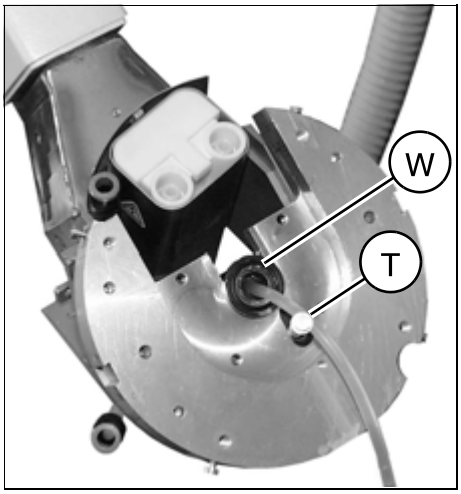



*Fig. 52: C body water supply*

## Cables in the Corrugated Tubing

Note: All cables must be disconnected from the shock wave head to replace parts of the corrugated tubing.

- Remove the cover panels on the basic system unit and the shock wave head.
- Remove the shock wave head (refer to the corresponding section).
- Push the temperature sensor slightly forward (T/Fig. 50 / p. 69) in the shock wave head support and then push it back to the side.
- Secure the spiral spring to the sensor supply cable approx. 4 cm (X/Fig. 51 / p. 70) behind the temperature sensor with adhesive tape to keep it from slipping back (KB/Fig. 51 / p. 70).
- **Up to support arm serial number 0050**
  - Remove the white teflon plate (TP/Fig. 50 / p. 69) by removing the screws.
  - Now pull the water supply (W/Fig. 52 / p. 70) in the shock wave head somewhat forward and then push it back to the side.
- **Beginning with support arm serial number 0051**
  - Remove the two screws (1/Fig. 53 / p. 71) .
  - Remove the lower part (2/Fig. 53 / p. 71).
- Remove the column cover (Fig. 55 / p. 73).
- Do not cut open the cable that fastens the corrugated tubing to the support arm. It can be opened with a slight turn of the screw.
- Unscrew the corrugated tubing (2/Fig. 55 / p. 73).
- Remove the disk (3/Fig. 56 / p. 73) from the corrugated tubing.
- Replace the corresponding cable in the corrugated tubing.
  - If the "temperature sensor" cable is being replaced, the water supply from the defective one must be transferred to the new pressure sensor (for more information on this procedure, refer to the section "Air Suction Hose").

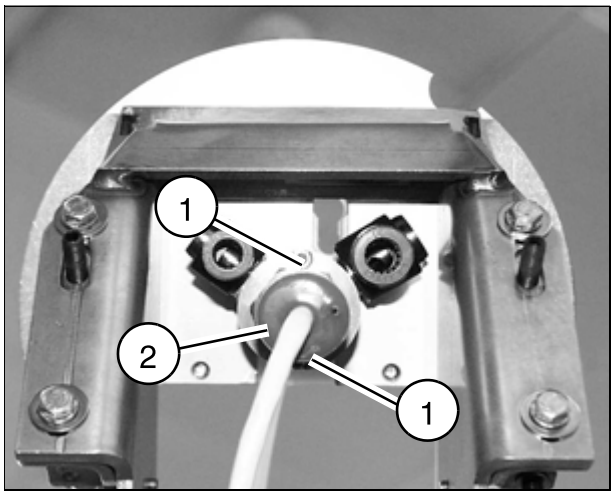



*Fig. 53: C body*

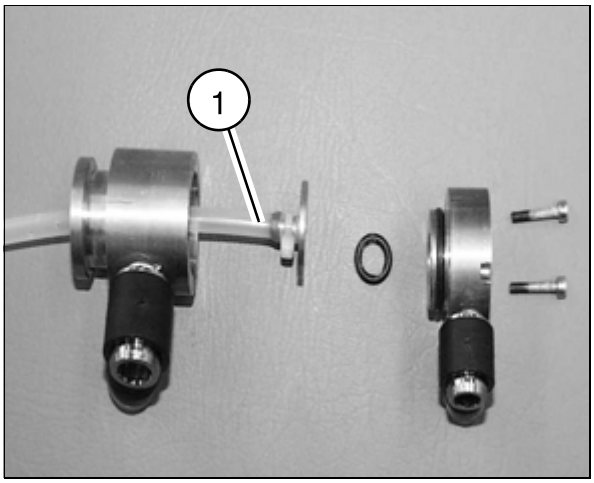



*Fig. 54: Suction hose*

- **Up to support arm serial number 0050**
  - Place the water supply (W/Fig. 52 / p. 70) in the shock wave head in the same manner as was done during removal.
  - Reattach the white teflon plate (TP/Fig. 50 / p. 69).
- **Beginning with support arm serial number 0051**
  - Reattach the lower part (2/Fig. 53 / p. 71).
  - Tighten the two screws (1/Fig. 53 / p. 71).
- Place the temperature sensor (T/Fig. 50 / p. 69) with the spiral spring from the back in the shock wave head in the same manner as was done during removal; ensure that the spring force of the spring pushes the temperature sensor to the front (T/Fig. 50 / p. 69).
- Reattach the disk (3/Fig. 56 / p. 73) to the corrugated tubing, make sure the leads are correctly connected.
  - High voltage cable (4/Fig. 56 / p. 73)
  - Tubing sections (5/Fig. 56 / p. 73)
  - Other lead (6/Fig. 56 / p. 73)
- Reattach the corrugated tubing with the screws.
- Route the cables and the hoses according to (Fig. 56 / p. 73).
- Reattach the column cover panel.
- Install the shock wave head assembly (refer to the corresponding section).
- Reattach all cover panels (refer to the corresponding section).

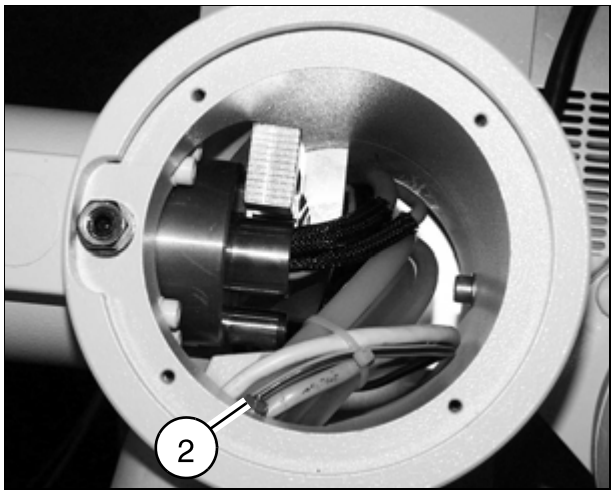



*Fig. 55: Column without cover*

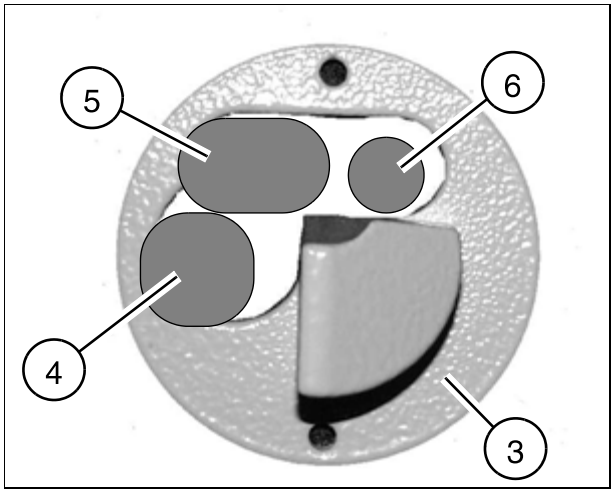



*Fig. 56: Corrugated tubing*

# Air Suction Hose

## Up to support arm serial number 0050

- Remove the cover panels of the basic system unit and the shock wave head.
- Remove the shock wave head (refer to the corresponding section).
- Pull the temperature sensor (T/Fig. 50 / p. 69) in the shock wave head support somewhat forward and then push it back through to the side.
- Secure the spiral spring to the sensor supply cable (X/Fig. 51 / p. 70) approx. 4 cm behind the temperature sensor with adhesive tape (KB/Fig. 51 / p. 70) to keep it from slipping back.
- Remove the white teflon plate (TP/Fig. 50 / p. 69) by removing the screws.
- Push the high-voltage connector (W/Fig. 52 / p. 70) slightly to the side for better access to the water supply (Fig. 52 / p. 70).
- Now pull the water supply (W/Fig. 52 / p. 70) with the center air suction hose slightly forward in the shock wave head support and then push it back through to the side.
- Remove the front bracket connection(F/Fig. 57 / p. 74) on the water supply by removing the screws.
- Remove the front part (E/Fig. 57 / p. 74) of the water supply by removing the screws.
- Disconnect the old water hose.
- Install the new water hose and secure it with the appropriate hardware.
- Remove the front part (E/Fig. 57 / p. 74) of the water supply by removing the screws.
- Puncture the tubing with a needle (approx. 1 mm) twice at this point (<--/Fig. 57 / p. 74).
- Insulate the bracket connection of the water supply (F/Fig. 57 / p. 74) just removed, i.e. attach new teflon insulation tape with the screws; when doing this, do not block the opening to the pressure sensor.

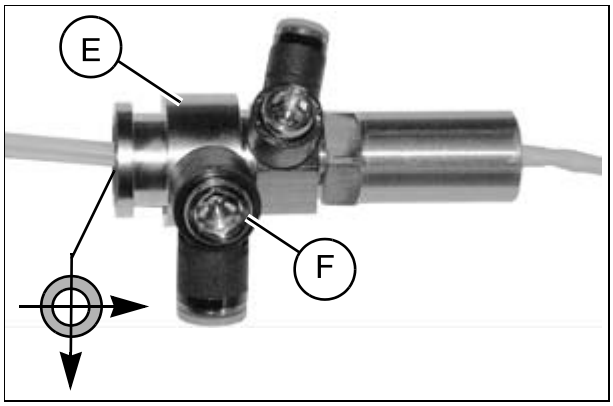



*Fig. 57: Head water supply*

- Install the water supply (W/Fig. 52 / p. 70) in the shock wave head support, following the same procedure as for removal.
- Reinstall the white teflon plate (TP/Fig. 50 / p. 69).

- Install the temperature sensor (T/Fig. 50 / p. 69) with the spiral spring in the shock wave head support following the same procedure as for removal in the reverse order; when doing this, make sure that the spring force of the spiral spring is pushing forward against the temperature sensor (Fig. 50 / p. 69).
- Install the shock wave head assembly (refer to the corresponding section).
- Reattach all cover panels (refer to the corresponding section).

## Beginning with support arm serial number 0051

- Remove the covers of the basic system unit and the shock wave head.
- Empty the coupling system (refer to specific paragraph).
- Remove the coupling bellows.
- Remove both screws (1/Fig. 53 / p. 71).
- Pull out the lower part (2/Fig. 53 / p. 71).
- Remove the part with the air suction hose (1/Fig. 54 / p. 72).
- Replace the air suction hose.
- Pierce the hose two times with a needle (approx. 1mm) in the same manner the old hose was pierced.
- Reassemble in the opposite order. Ensure proper positioning of the Allen screws during reassembly.

# D3 Board or Chip Card Reader

## Notice for LITHOSTAR MODULARIS with the Gold Card:

- Do not use the Gold card to troubleshoot other systems!
- Changing the Gold card too many times will render it unusable.
- After each change of the Gold card to another system, the user must confirm this on the control unit.
- The Gold card and the board each contain an internal counter; if these counters do not have the same value, the counter values will increase.
- If the card must be changed due to service, the switch on the D3 board must be set to service prior to beginning the service work. In this case, the counter values will not change. However, triggering of shock waves will be blocked but the system will initialize.
- If D3/M13 is being replaced, an internal counter on the Gold card will count up. The Gold card will be automatically rendered unusable if the Init counter in the "Chip Card" menu exceeds "3".
- A new Gold card must be ordered from the sales department. After receiving the new Gold card, the old card must be returned to SPL in Erlangen. If the card is not returned, full price will be charged.

## Replacing the D3 Board

- Prior to installing a new board, if possible, read out the counter status and record the value in the Operating Protocol (Protocols Register).
- Prior to removing the D3 the, remove the chip card (Gold card or pay-per-use) from the reader.
  - For Gold card only: Prior to ejecting the card, remove the reader from the covers by removing the screws (the insertion slot must be clear).
  - Eject: Set the switch on the D3 board to the service mode. In the service menu, select chip card and eject.
- Switch the system off. Replace the D3 board. Prior to installing the board, check whether the battery is connected.
- If the ultrasound localization is available, assemble the D3 board on the new ultrasound addition.
- Switch the system on.
- Connect the service PC and then connect to the LITHOSTAR MODULARIS. Perform a software download (Service Software / p. 31).
- Perform the system-specific settings: time, language, table right or left, pulse rate, ECG triggering.
- Reset the S2 switch on the D3 board to the normal mode.
- Turn the system off and then on again.

- Depending on the language selected, the following text will appear on the control display panel of the LITHOSTAR MODULARIS:
  - "Bitte eine LITHOCARD einlegen!"
  - "Please insert a LITHOCARD!"
  - "Introducir una LITHOCARD!"
  - "Veuiller insérer une LITHOCARD!"
- Insert a "pay per use" card or a "gold card"

  ➪ If a gold card is inserted, the following text is displayed: "New LITHOCARD Gold" inside! Increment INIT Counter? - Answer "Yes" to this question.
- For Gold card only: install the chip card reader.
- If the ultrasound localization is available, the potentiometer will have to be adjusted accordingly (see chapter on "Service software", select option: u).
- Check whether the default values for ultrasound are available (SPL1-130.038.01...) and whether any necessary changes were made.

## D3 Board Expansion (Ultrasound)

If the ultrasound addition is being replaced, the potentiometer will have to be adjusted accordingly (see chapter on "Service software", select option: u).

## Pressure Measurement

Note: Coupling bellows (C-system), item number 16 12 337 must be used to perform the pressure measurement.

- Switch the system off.
- Remove the covers of the shock wave head (refer to the corresponding section).
- Remove the coupling bellows; when doing this, carefully pull the guide pin out of the air suction hose (Fig. 39 / p. 55) / (Fig. 40 / p. 55).
- Loosen the four screws (V/Fig. 34 / p. 51) on the isocenter phantom but do not remove them.
- Flip the isocenter phantom forward and remove it completely.
- Install the C-system coupling bellows for the pressure measurement.
- Fill the coupling system (refer to the corresponding sections).
- Remove any air bubbles in the coupling bellows. Install the adapter for the pressure measurement.
- Perform the pressure measurement.
- The instructions for performing the pressure measurement are shipped with the shock wave pressure test device (PTU).
- After completing the pressure measurement, restore the system to its previous status.

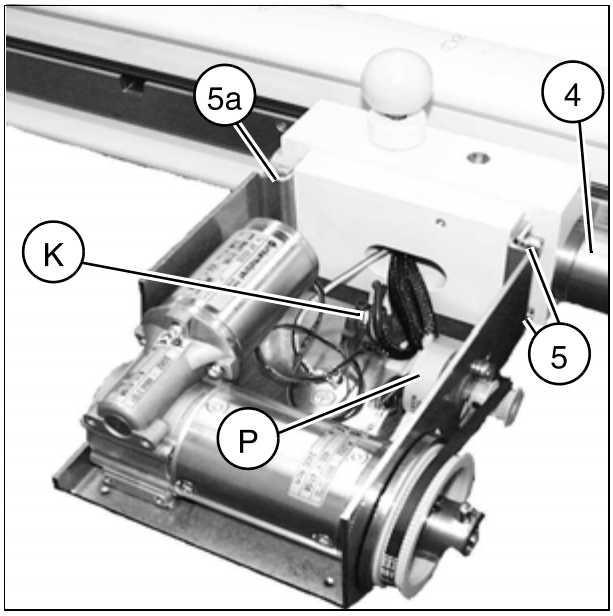



*Fig. 58: Angulation drive*

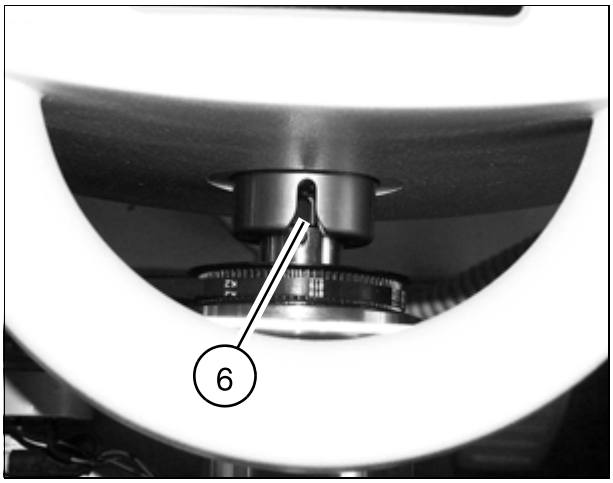



*Fig. 59: Potentiometer shaft*

## Potentiometer for Angulation Drive

- Couple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C.
- Set the C-arm to 0°.
- Open the cover on the angulation drive (Fig. 58 / p. 79).
- Unsolder the cables at the potentiometer (P/Fig. 58 / p. 79)); when doing this, record the color coding of the cables to the potentiometer connections to ensure correct reconnection.
- Remove the old potentiometer completely (P/Fig. 58 / p. 79).
- Install and solder in the new potentiometer.
- Set the potentiometer to 500  10 Ohms or 5.0  0.1 Volts (center position). The potentiometer setting can also be checked using the Service PC (Service Software / p. 31).
- Tighten the toothed belt.
- Perform C-Arm adjustment as described in (Fig. 31 / p. 48).
- Reinstall the cover panels.

## Angulation Drive (C-Arm Drive)

- Open the cover of the angulation drive.
- Disconnect the motor cable coming from the unit at the clamp (K/Fig. 58 / p. 79).
- Unsolder the cables at the potentiometer (P/Fig. 58 / p. 79); when doing this, record the color coding of the cables to the potentiometer connections to ensure correct reconnection.
- Remove the old angulation drive completely.
- Install the new angulation drive. Do not tighten the mounting screws yet (5/5a/Fig. 58 / p. 79).
- Adjust the C-Arm to 0°.
- Couple the LITHOSTAR MODULARIS to the SIREMOBIL Iso -C.
  - The pin (6/Fig. 59 / p. 80) should go into the guide easily; if not, rotate the motor via the control panel of the LITHOSTAR MODULARIS.
  - If the screws can still be loosened (5/5a/Fig. 58 / p. 79). Follow the correct sequence when tightening (5 up, 5 down, 5a up, 5a down/Fig. 58 / p. 79).
- Set the potentiometer to 500  10 Ohms or 5.0  0.1 Volts (center position). The potentiometer setting can also be checked using the Service PC (Service Software / p. 31).
- Tighten the toothed belt.
- Adjust the C-Arm according to the description on pages (Fig. 31 / p. 48).
- Reattach the motor cover panel.

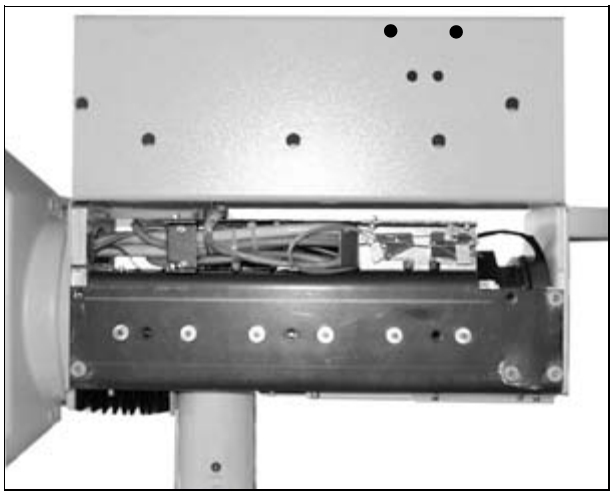


*Fig. 60: Horizontal carriage cover*

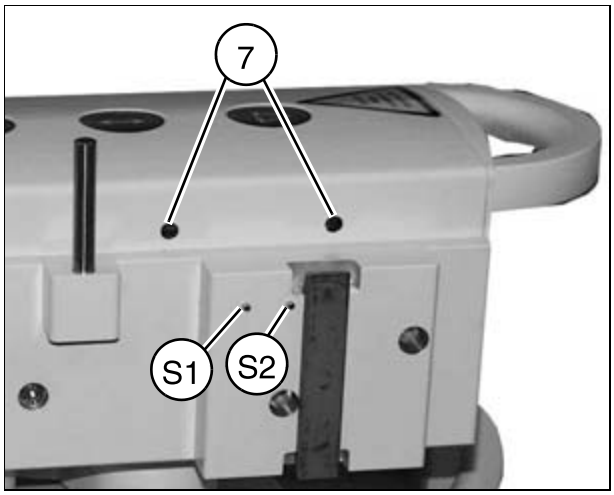



*Fig. 61: Support arm*

## SIREMOBIL Iso-C

<table>
<tr><td>System configuration n = several</td><td>1 LITHOSTAR MODULARIS and 1 SIREMOBIL Iso-C</td><td>1 LITHOSTAR MODULARIS and n SIREMOBIL Iso-C</td></tr>
<tr><td rowspan="2">Docking plate removal</td><td>Up to support arm S0050<br>For adjustment of the isocenter on the shock wave head; refer to chapter (LITHOSTAR MODULARIS up to Support Arm Serial Number 0050 / p. 97).</td><td rowspan="2">It is important to follow this work flow to avoid having to readjust the isocenter on all SIREMOBILEs!<br>• Prior to removing the docking plate, view the isocenter (the three C-arm positions) and if possible, save it or make a hardcopy.<br>• Remove the docking plate (mark the position on the SIREMOBIL Iso-C).<br>• Perform the necessary work on the SIREMOBIL Iso-C.<br>• Secure the docking plate back in place.<br>• Check isocenter; the setting must be identical to how it was prior to removing the docking plate. If an adjustment is necessary, it must be made via the isocenter setting on the SIREMOBIL Iso-C; refer to chapter (LITHOSTAR MODULARIS beginning with Support Arm Serial Number 0051 / p. 103).</td></tr>
<tr><td>Beginning with support arm S0051<br>For adjustment of isocenter on the SIREMOBIL Iso-C; refer to chapter (LITHOSTAR MODULARIS beginning with Support Arm Serial Number 0051 / p. 103).</td></tr>
</table>

# Switches

CAUTION: Lift switch-off for the SIREMOBIL Iso-C may not function if the floor is not level. If this is the case, make use of the additional castors (see also Operating Instructions).

## Replacing Switches

| NOTE | **If the docking plate was removed, the isocenter must be checked.** |
|---|---|

- Remove the docking plate by removing the screws.
- Remove the horizontal carriage cover of the SIREMOBIL:
  - to do this, remove the six screws on the underside,
  - expand the cover slightly and push it up (Fig. 60 / p. 82).
- Replace the switch.
- Reattach the horizontal carriage cover on the SIREMOBIL with the screws.
- **Up to support arm serial number 0050**
  - Reattach the docking plate so that it is seated on the threads of the screws. Tighten the mounting screws with a torque of 18 Nm.
- **Beginning with support arm serial number 0051**
  - Tighten the plate (9/Fig. 61 / p. 83) to a torque of 18 Nm.
  - Tighten the plate (8/Fig. 61 / p. 83) to a torque of 10 Nm.

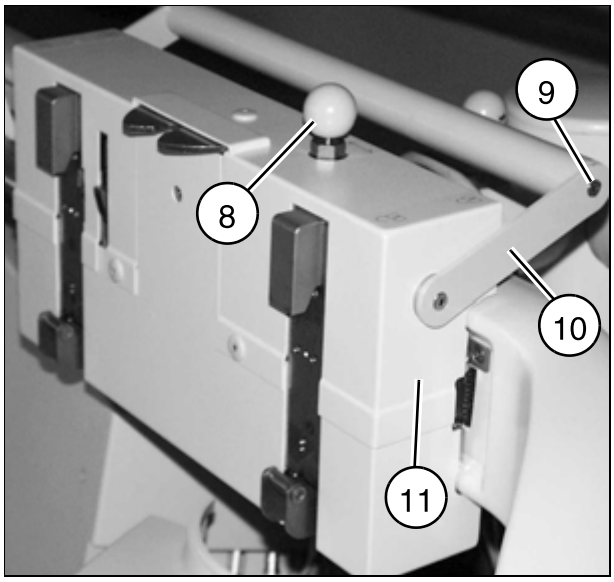



*Fig. 62: Docking plate*

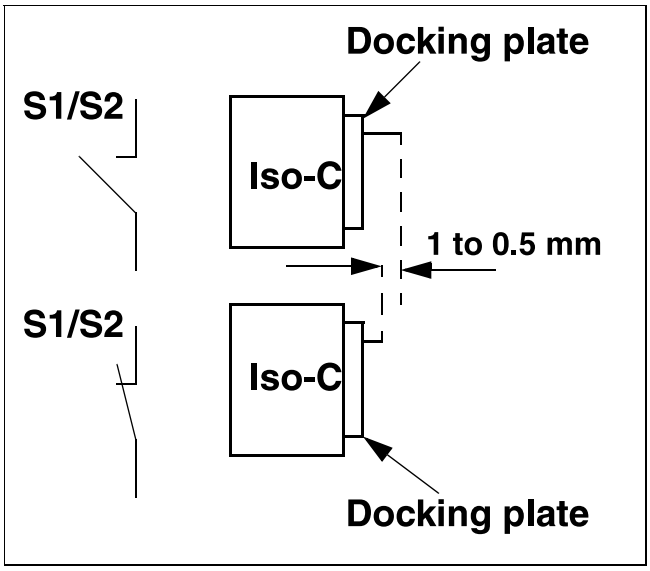



*Fig. 63: Docking schematic*

## Adjusting the S1/S2 Switches

- Adjustment of activating lever (Fig. 63 / p. 86).
- When activating the S1 pin (Fig. 61 / p. 83), movement of the vertical column is blocked.
  - When activating pin S2 (Fig. 61 / p. 83), movement of the vertical column are blocked in both directions.
- The screws behind the opening (7/Fig. 61 / p. 83) should be loosened only. Move the switch until switching function is activated and tighten the screws.

## Setting the Cam on the LITHOSTAR MODULARIS

| NOTE | **Necessary only if the switch on the SIREMOBIL Iso-C cannot be adjusted.** |
|---|---|

- Remove the knob (8/Fig. 62 / p. 85); lift up the ball and secure the axis against moving.
- **Up to support arm serial number 0050**
  - Remove the countersunk screw (9/Fig. 62 / p. 85).
  - Remove all screws from the covers.
  - Firmly pull the handle apart (10/Fig. 62 / p. 85).

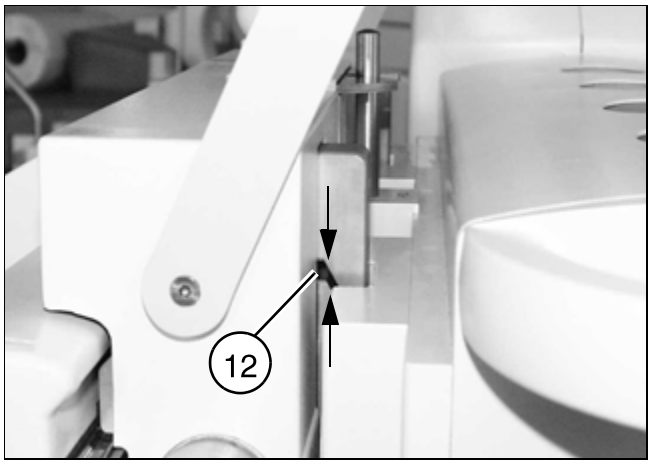



*Fig. 64: Docking plate distance*

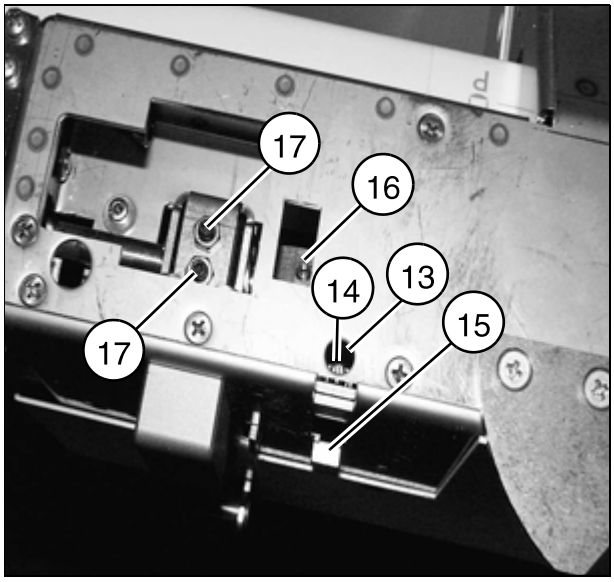



*Fig. 65: Adjustment nuts*

- **Beginning with support arm serial number 0051**
  - Remove all cover screws.
- Remove the upper portion of covers (11/Fig. 62 / p. 85).
- Couple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C.

- Raise the vertical column of the SIREMOBIL Iso-C until the LITHOSTAR MODULARIS hooks onto the docking plate of the SIREMOBIL Iso-C (12/Fig. 64 / p. 87).
- Loosen the lock nut (13/Fig. 65 / p. 87).
- Rotate the threaded nut (14/Fig. 65 / p. 87) to adjust the cam (15/Fig. 65 / p. 87) so that the switch is rotated. Upward movement of the SIREMOBIL Iso-C is blocked.
- Tighten the lock nut (13/Fig. 65 / p. 87)(13/Fig. 35).
- Temporarily attach the braking handle.
- Lock the LITHOSTAR MODULARIS and the SIREMOBIL Iso-C together.
- Downward movement must be blocked. If not:
  - loosen the set screw (16/Fig. 65 / p. 87).
  - rotate the lever until the switch is activated.
  - tighten the set screw (16/Fig. 65 / p. 87).
- Reattach the covers.

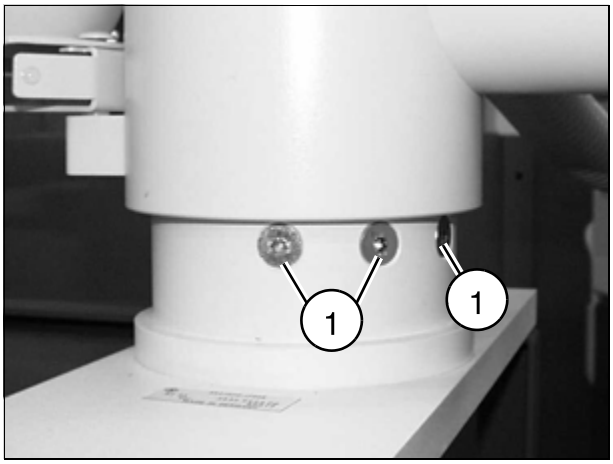



*Fig. 66: Column mount*

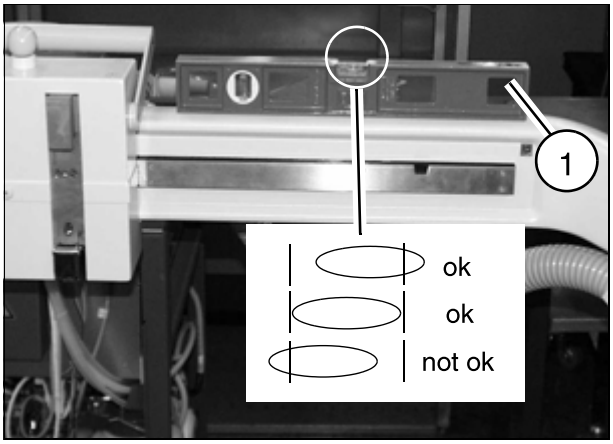



*Fig. 67: Balance arm*

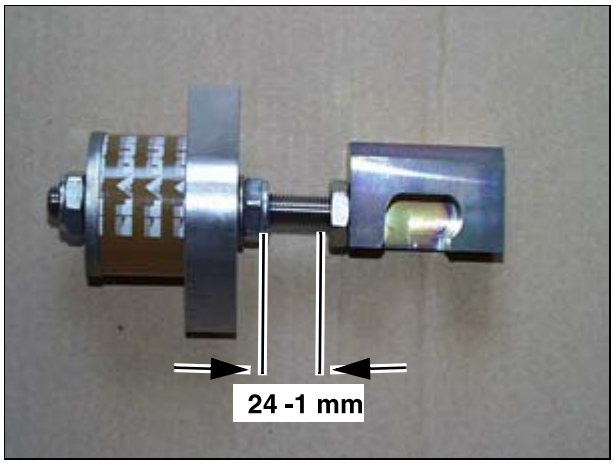



*Fig. 68: Spring mount*

## Balancing Spring for the Support Arm

- Position the support arm vertically.
- Remove covers from the cart.
- Remove the cover from the column/mount for ECG triggering.
- Remove the cover from the high voltage connector on the charge device (this simplifies removing the spring mount).
- Remove the 3 screws (1/Fig. 66 / p. 88). Take out the spring mount.
- Remove the spring mount.
- Replace the balancing spring.
  - If the mount is different from the one shipped, it must be replaced as well.
  - Be sure to maintain the correct spacing (Fig. 68 / p. 89).
- Reinstall the spring mount.
- Perform the following check:
  - position the support arm horizontally and place it in the docking position (center locking position).
  - place a level on the support arm (1/Fig. 67 / p. 88).
  - the air bubble can incline to the right, but not to the left (Fig. 67 / p. 88). If the air bubble moves to the left side, the spring must be replaced.

- Check the isocenter under radiation.

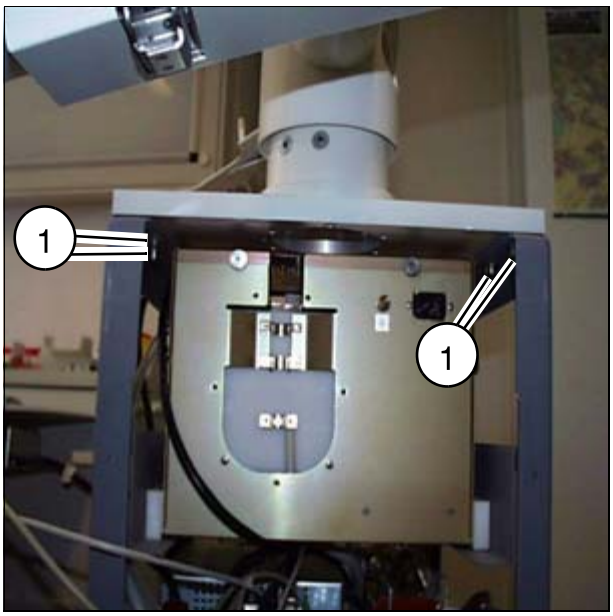



*Fig. 69: Replacing the support arm*

## Support Arm Replacement

- Remove the system cover panels and the covers on the shock wave head.
- Empty the coupling system (refer to "Emptying the Coupling System" section).
- Empty the cooling system (refer to "Emptying the Cooling System" section).
- Switch the unit off and disconnect it from the power supply.
- Remove the shock wave head (Shock Wave Head / p. 51).
- Remove the residual water from the hoses.
- If the ECG triggering option is available, remove the Sirecust from the docking station and unscrew it.
- Open the charging unit and disconnect the high-voltage connection (Charging Unit / p. 65).
- Disconnect all cables and hoses in the unit coming out of the corrugated hose.
- Unscrew the corrugated hose (2/Fig. 55 / p. 73).
- Remove cables and hoses from the rotary joint.

| NOTE | **2 persons are required temporarily to replace the support arm.** |
|---|---|

- Loosen the 4 screws on the support arm mount (1/Fig. 69 / p. 90).
- Remove the old support arm and position the new one.
- Tighten the 4 mounting screws (1/Fig. 69 / p. 90) to 20 Nm torque.
- Push the cables and hoses through the opening of the rotary joint and run them down. Refer to (Fig. 55 / p. 73) for the cable run. Fasten the corrugated hose to the rotary joint (2/Fig. 55 / p. 73).

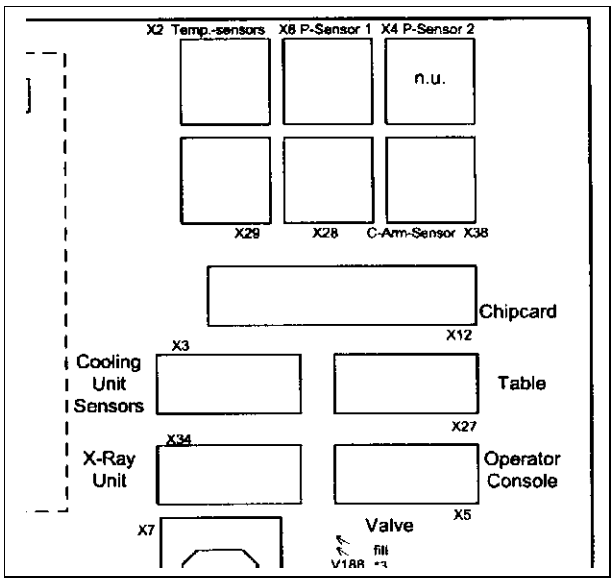



*Fig. 70: D3 layout*

- Check and, if necessary, correct the cable run in all positions of the support arm.
- Plug in or fasten cables and hoses again according to the designations. Refer to (Fig. 70 / p. 91) for the connector designations on the D3 board.

- Install the water supply shipped with the support arm (Air Suction Hose / p. 74).
- Install the shock wave head completely (Installing the Shock Wave Head / p. 54).
- If the ECG triggering option is available, pull the trigger cable and cable for Sirecust power supply upwards through the rotary joint.
- Strain-relieve the cable on the docking station and install docking station.
- Fill cooling system and coupling system (Filling the Cooling System / p. 59).
- Adjustment of the lift switch-off (Adjusting the S1/S2 Switches / p. 86).
- Adjustment of the clamping
  - For docking plate serial numbers < 0050, turn in the screws (17/Fig. 65 / p. 87) on both clamping hooks symmetrically until the correct clamping force is reached. Then lock the screws again.
  - For docking plate serial numbers > 0051 (see Installation and Setting Instructions SPL 1-130.033.01 page 4-2) .
- Adjustment of the angulation motor (Angulation Drive (C-Arm Drive) / p. 82).
- Check shot triggering and centering.
- Attach all cover parts.

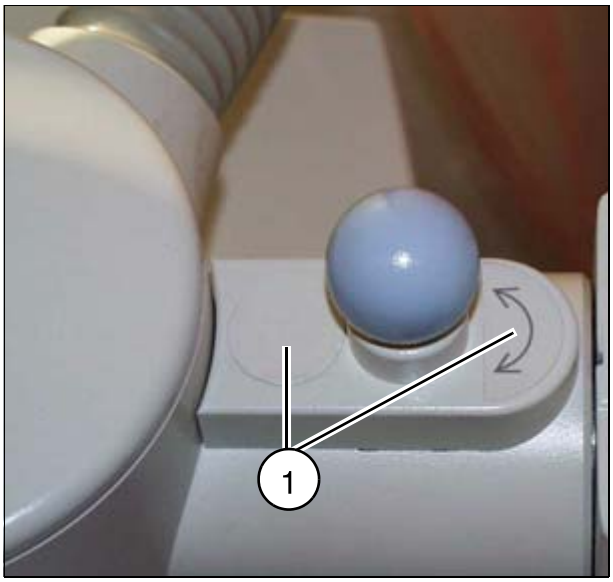



*Fig. 71: Rotary label*

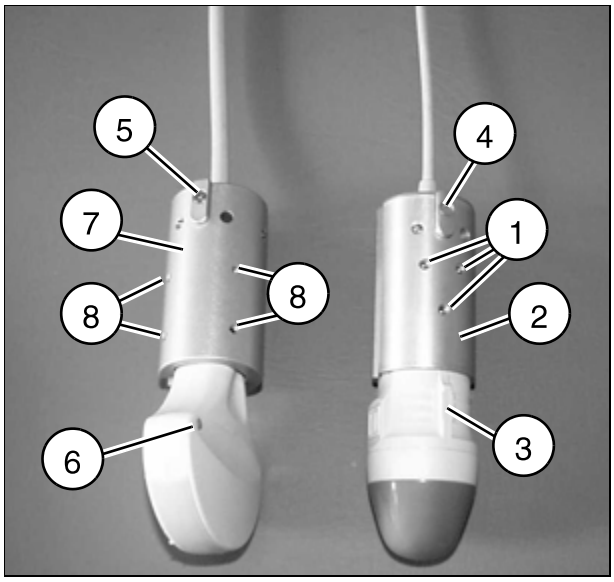



*Fig. 72: Changing probes*

## Rotary Joint Latch Replacement

- Remove the two labels (1/Fig. 71 / p. 92).
- Loosen the screws located below and remove the rotary joint lock.
- Remove any burrs that may be present on the catch holes.
- Install the new rotary joint lock.
- Affix the labels again.
- Check the latch in all positions.

# Replacing the Probe

## Sector Probe

- Loosen the 6 screws (3 are not visible) (1/Fig. 72 / p. 93) and remove the sleeve (2/Fig. 72 / p. 93).
- Attach the sleeve on the new probe. Pay particular attention to the positioning, the mark ((3/Fig. 72 / p. 93) and (4/Fig. 72 / p. 93) must be lined up.
- Tighten the 6 screws.
- Check the ultrasound isocenter.

## Curved Probe

- Loosen the 8 screws (4 are not visible) (8/Fig. 72 / p. 93) and remove the sleeve (7/Fig. 72 / p. 93).
- Attach the sleeve on the new probe. Pay particular attention to the positioning; the narrow side with the orange dot (6/Fig. 72 / p. 93) and (5/Fig. 72 / p. 93) must line up.
- Tighten the 8 screws.
- Check the ultrasound isocenter.

## Final Work Steps

- Perform the ground wire measurement.
- Test all functions from the control panel.

## LITHOSTAR MODULARIS up to Support Arm Serial Number 0050

**NOTE**

**The ball will jump when zooming, but this has no effect.**

### Adjustment Procedure

Prerequisite: The potentiometer must be correctly adjusted on the motor.

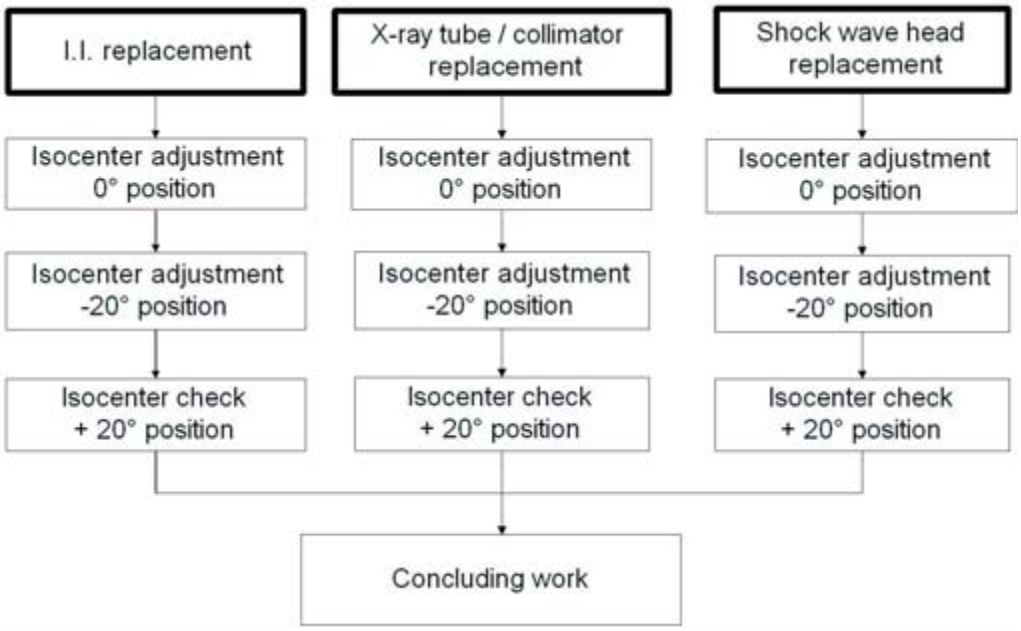

I.I. replacement
X-ray tube / collimator replacement
Shock wave head replacement
Isocenter adjustment 0° position
Isocenter adjustment 0° position
Isocenter adjustment 0° position
Isocenter adjustment -20° position
Isocenter adjustment -20° position
Isocenter adjustment -20° position
Isocenter check + 20° position
Isocenter check + 20° position
Isocenter check + 20° position
Concluding work

*Fig. 73:*

If screws were loosened on the adjustment direction of the shock wave head, they must be tightened before checking the isocenter with X-ray.

**NOTE**

**Before the isocenter can be checked or adjusted, the following settings must be performed on the SIREMOBIL Iso-C:**

**1. Camera rotation to 0°.**

**2. Deselect vertical image reverse (LED is off).**

**3. Deselect horizontal image reverse (LED off).**

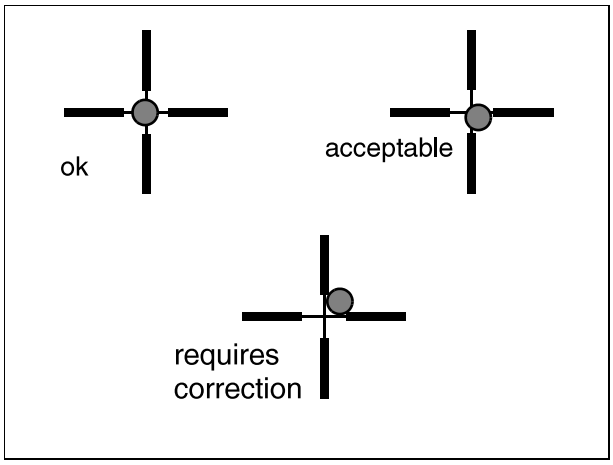



*Fig. 74: Cross hair focusing*

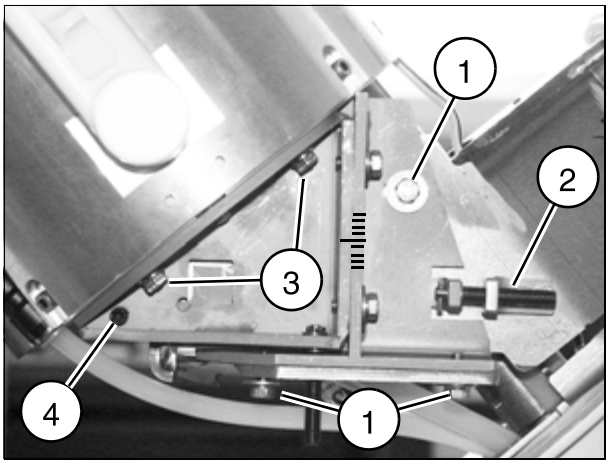



*Fig. 75: hms 1 (head mounting socket)*

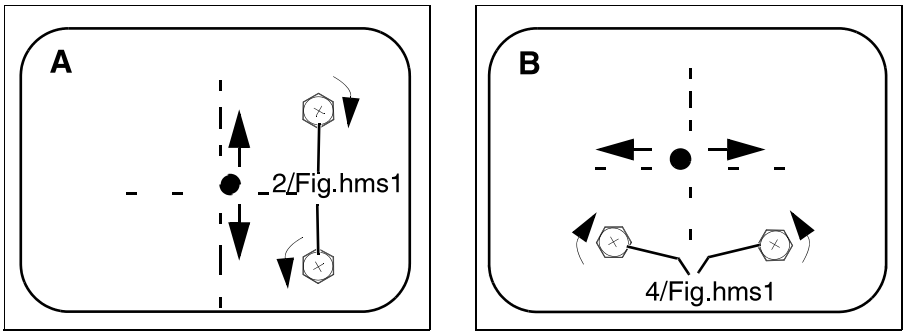



*Fig. 76: Left and right adjustment*

## Adjusting the 0° Position

- Remove the cover on the shock wave head (Shock Wave Head / p. 51).
- Couple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C as described in the operating instructions. Do not couple the motor yet.
- Manually perform the orbital movement (angulation range approx. 30°).

- Set the SIREMOBIL Iso-C to orbital and angulation direction 0°.
- Couple the motor.
- Flip up the isocenter phantom.
- Switch fluoro ON briefly.

  The ball must be in the center of the cross (Fig. 74 / p. 98).
- If required, adjust the shock wave head as shown in (A or B/Fig. 76 / p. 98):

| | |
|---|---|
| **A:** Loosen the screws (1/Fig. 75 / p. 98) on both sides.<br><br>Shift it with the screws (2/Fig. 75 / p. 98).<br><br>Retighten the screws (1/Fig. 75 / p. 98) on both sides. | **B:** Loosen the screws (3/Fig. 75 / p. 98) on both sides.<br><br>Shift it with the screws (4/Fig. 75 / p. 98).<br><br>Retighten the screws (3/Fig. 75 / p. 98) on both sides. |

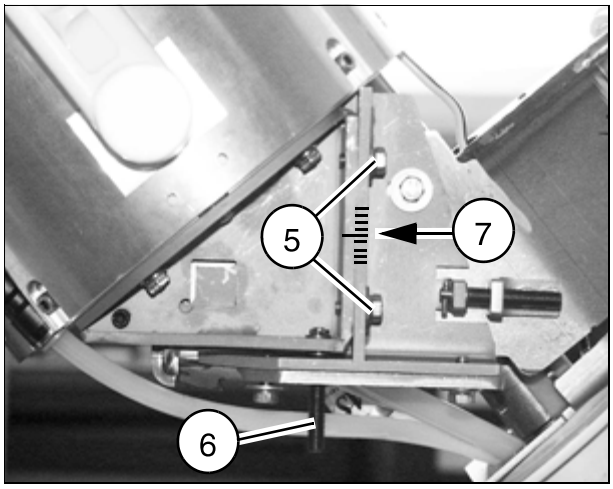



*Fig. 77: hms 2*

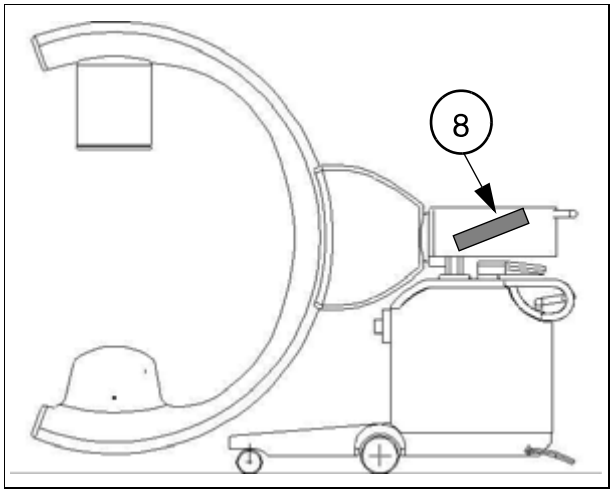



*Fig. 78: Iso-C high*

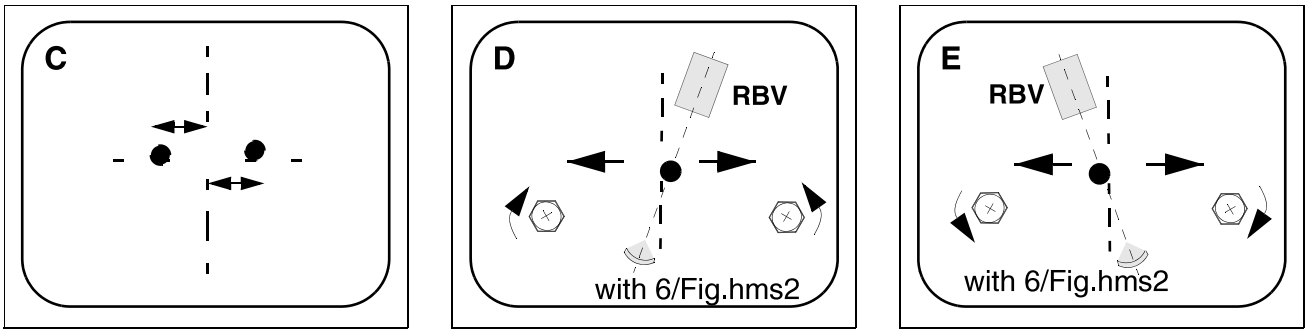



*Fig. 79: Vertical adjustment*

## Adjusting the 20° Position

**NOTE**

**The position of the ball does not have to be identical in both 20° positions. However the tolerances must be maintained (Fig. 74 / p. 98).**

- Move the C-Arm into one of the two 20° positions.
- Switch fluoro ON briefly. The ball must be in the center of the cross (Fig. 74 / p. 98).
- Move the C-Arm into the other 20° position.
- Switch fluoro ON briefly. The ball in the adjustment area must be located in the center of the centering cross (Fig. 74 / p. 98).
- The distance from the phantom to the center of the centering cross must be the same for both 20° positions (with a maximum difference of 2 mm) (C/Fig. 79 / p. 100).
- If not, adjust the shock wave head as shown in (D or E/Fig. 79 / p. 100):
  - Loosen the screws (5/Fig. 77 / p. 99) on both sides.

| | |
|---|---|
| **D:** Move the C-Arm into the 20° position as shown in (D/Fig. 79 / p. 100) (viewed from the table). | **E:** Move the C-Arm into the 20° position as shown in (E/Fig. 79 / p. 100) (viewed from the table). |
| Correct the position of the shock wave head with the screw (6/Fig. 77 / p. 99) as shown in (D/Fig. 79 / p. 100). | Correct the position of the shock wave head with the screw (6/Fig. 77 / p. 99) as shown in (E/Fig. 79 / p. 100). |

- The shock wave head must be moved in parallel (see scale (7/Fig. 77 / p. 99)). The screw (6/Fig. 77 / p. 99) is also located on the other side of the shock wave head support. If the shock wave head cannot adjusted, "rotate" the docking plate at the SIREMOBIL Iso-C , i.e. the back part is higher than the front (8/Fig. 78 / p. 99).

- If the connecting position of the docking plate has changed, check the settings for the lift stop switch on the SIREMOBIL Iso-C.
  - Tighten the screws (5/Fig. 77 / p. 99) on both sides.

## Final Work Steps

- Perform the ground wire measurement.
- Perform a function check.

# LITHOSTAR MODULARIS beginning with Support Arm Serial Number 0051

| NOTE | The ball will jump when zooming, but this has no effect. |
|---|---|

## Adjustment Procedure

Prerequisite: The potentiometer must be correctly adjusted on the motor.

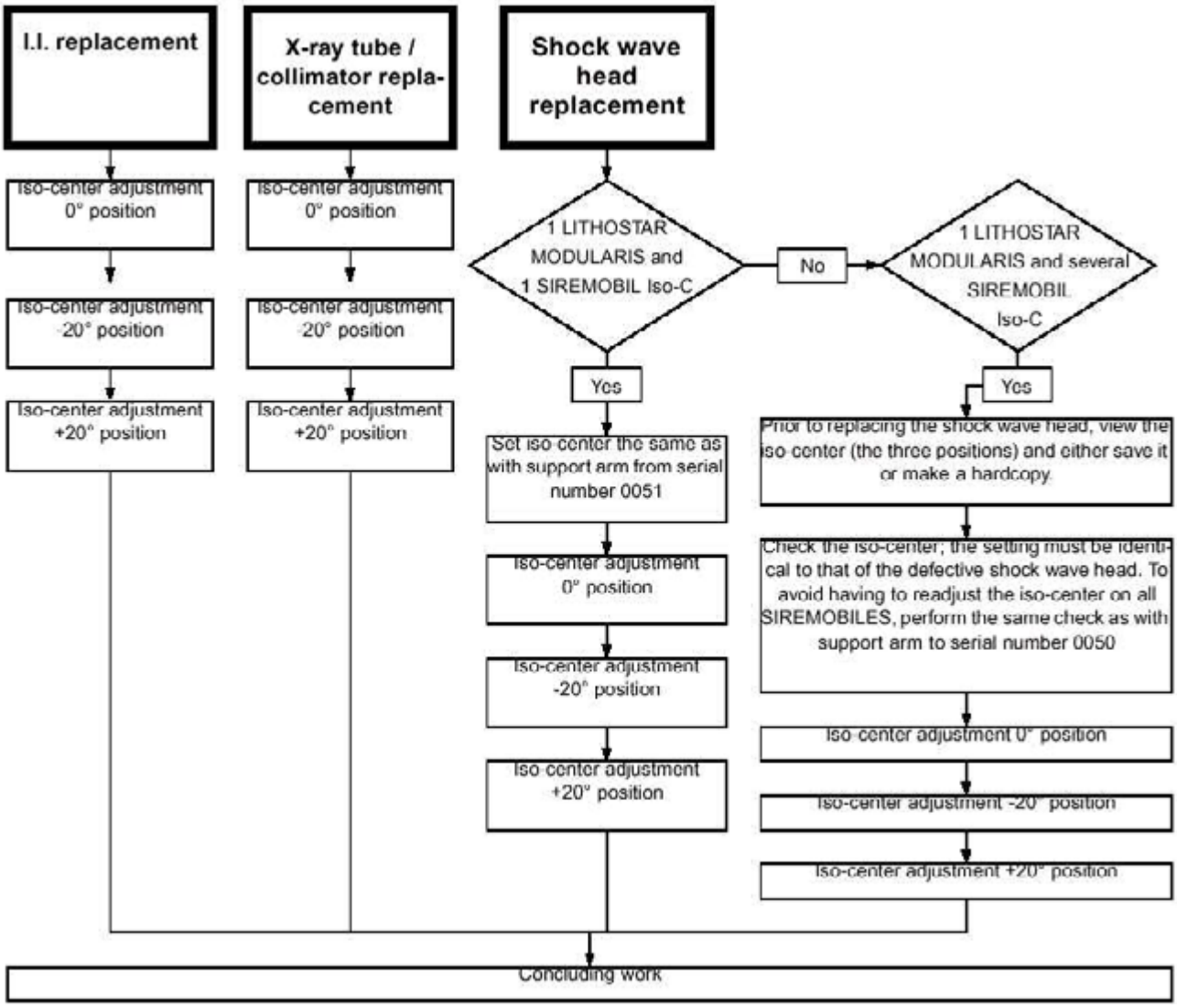

I.I. replacement
X-ray tube / collimator replacement
Shock wave head replacement
Iso-center adjustment 0° position
Iso-center adjustment 0° position
Iso-center adjustment -20° position
Iso-center adjustment -20° position
Iso-center adjustment +20° position
Iso-center adjustment +20° position
1 LITHOSTAR MODULARIS and 1 SIREMOBIL Iso-C
No
1 LITHOSTAR MODULARIS and several SIREMOBIL Iso-C
Yes
Yes
Set iso center the same as with support arm from serial number 0051
Prior to replacing the shock wave head, view the iso center (the three positions) and either save it or make a hardcopy
Iso-center adjustment 0° position
Check the iso-center; the setting must be identical to that of the defective shock wave head. To avoid having to readjust the iso-center on all SIREMOBILES, perform the same check as with support arm to serial number 0050
Iso-center adjustment -20° position
Iso center adjustment 0° position
Iso-center adjustment -20° position
Iso center adjustment +20° position
Iso-center adjustment +20° position
Concluding work

*Fig. 80:*

If screws were loosened on the adjustment direction of the shock wave head, they must be tightened before checking the isocenter with X-ray.

**NOTE**

**Before the isocenter can be checked or adjusted, the following settings must be performed on the SIREMOBIL Iso-C:**

**1. Camera rotation to 0°.**

**2. Deselect vertical image reverse (LED is off).**

**3. Deselect horizontal image reverse (LED off).**

*Fig. 81: hms 3*

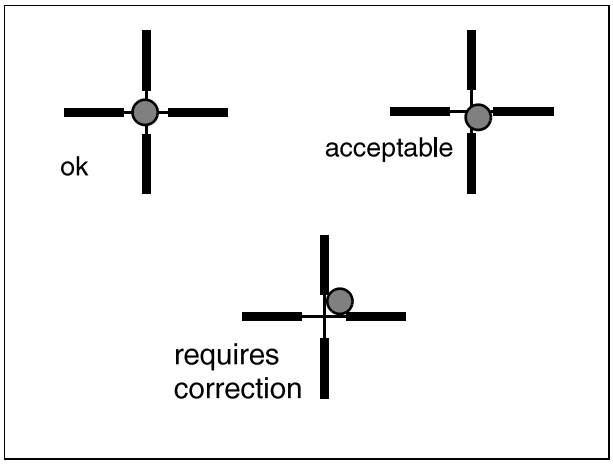



*Fig. 82: Cross hair focusing*

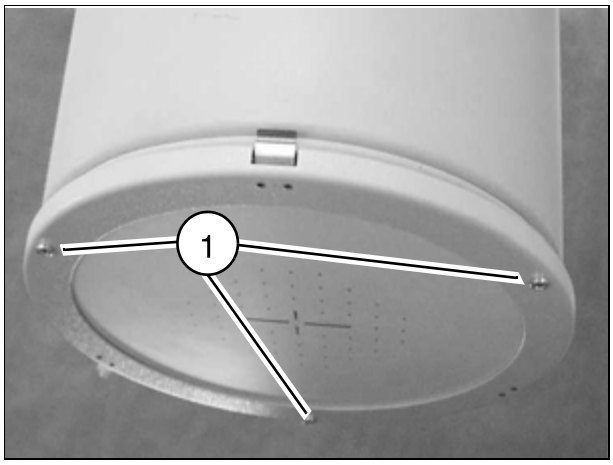



*Fig. 83: I.I. cross hairs*

## Adjusting the 0° Position

- Couple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C as described in the operating instructions. Do not couple the motor yet.
- Manually perform the orbital movement (angulation range approx. 30°).
- Set the SIREMOBIL Iso-C to orbital and angulation direction 0°.
- Couple the motor.
- Flip up the isocenter phantom.
- Turn fluoro ON briefly. The ball must now be in the center of the cross (Fig. 82 / p. 104).

  If not:
  - Slightly loosen the three screws on the I.I. (1/Fig. 83 / p. 105).
  - Adjust the component with the cross hair so that the ball is located in the cross hairs (Fig. 82 / p. 104).
  - After adjusting the setting, retighten all screws.
- If adjustment is not possible, adjust as for the support arm - serial no. < 0050.

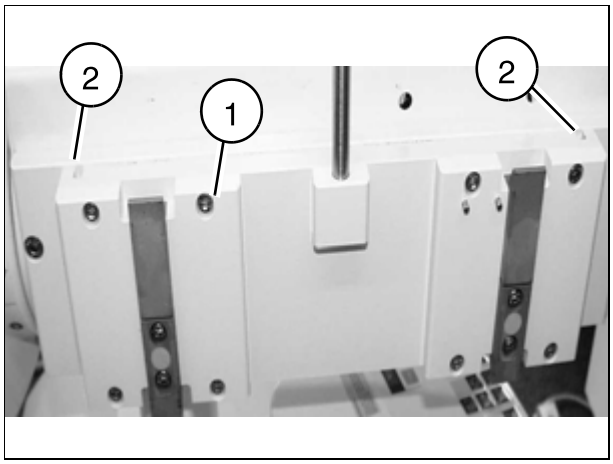



*Fig. 84: Docking mount*

## Adjusting the 20° Position

**NOTE**

**The position of the ball does not have to be identical in both 20° positions. However the tolerances must be maintained (Fig. 82 / p. 104).**

- Move the C-Arm into one of the two 20° positions.
- Switch fluoro ON briefly. The ball must be in the center of the cross (Fig. 82 / p. 104), if not:
  - decouple the LITHOSTAR MODULARIS from the SIREMOBIL Iso-C and slightly loosen the eight screws (1/Fig. 84 / p. 105).
  - Recouple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C.
  - Move the C-Arm into the 20° position.
  - Use the adjustment screws (2/Fig. 84 / p. 105) to adjust the support arm so that the ball is located in the cross hairs (Fig. 82 / p. 104).
  - Once the isocenter is correctly set, couple the LITHOSTAR MODULARIS again and tighten the eight screws (1/Fig. 84 / p. 105) to a torque of 10 Nm.
  - Recouple the LITHOSTAR MODULARIS to the SIREMOBIL Iso-C and check the switch setting on the SIREMOBIL Iso-C for column stop and reset if necessary.
  - Angulation motor - check adjustment.

## Final Work Steps

- Perform the ground wire measurement.
- Perform a function check.

# LITHOSTAR MODULARIS as a "LithoShare" Procedure

LithoShare

LithoShare is the name for the LITHOSTAR MODULARIS that can be coupled to different SIREMOBIL Iso-C (they must be prepared) without having to again reset the isocenter. In this way, the user acquires several SIREMOBIL Iso-C but only one LITHOSTAR MODULARIS.

## Adjustment

- Adjusting the isocenter is performed in the same manner as described in the paragraph "LITHOSTAR MODULARIS beginning with support arm serial number 0051".
- Adjusting the isocenter must be performed on each SIREMOBIL Iso-C.
- Adjusting the potentiometer on the angulation motor can be performed only on **one**-SIREMOBIL Iso-C.

The mechanical adjustment of a motor can be performed only on **one** SIREMOBIL Iso-C.

**NOTE**

**A "Master SIREMOBIL Iso-C" must be defined where the potentiometer adjustment and motor adjustment is performed.**

If parts pertaining to the isocenter are replaced in a "LithoShare" system, then the system that has the replaced parts must always be adjusted.

i.e.

Replace the shock wave head -> adjustment of isocenter on the LITHOSTAR MODULARIS. Replace the switch in the SIREMOBIL Iso-C -> adjustment of isocenter on the SIREMOBIL Iso-C.

## Preparations

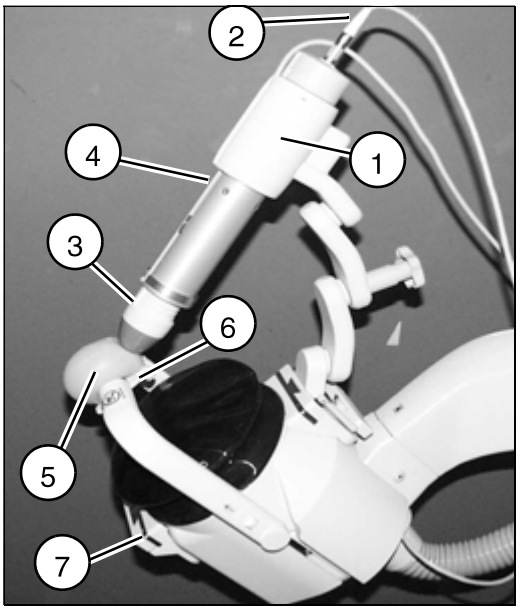



*Fig. 85: Probe mounting*

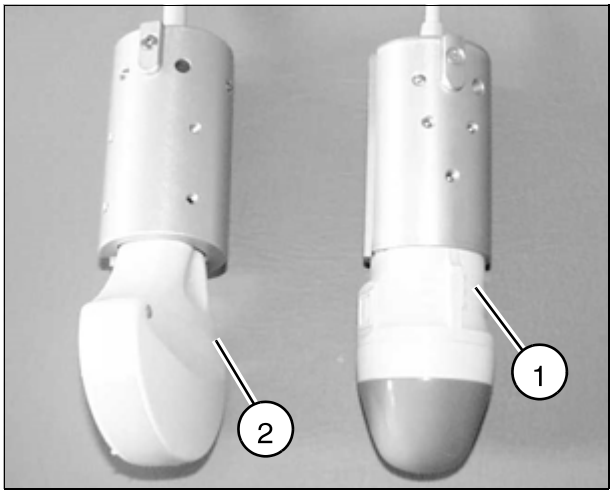



*Fig. 86: Sector and array*

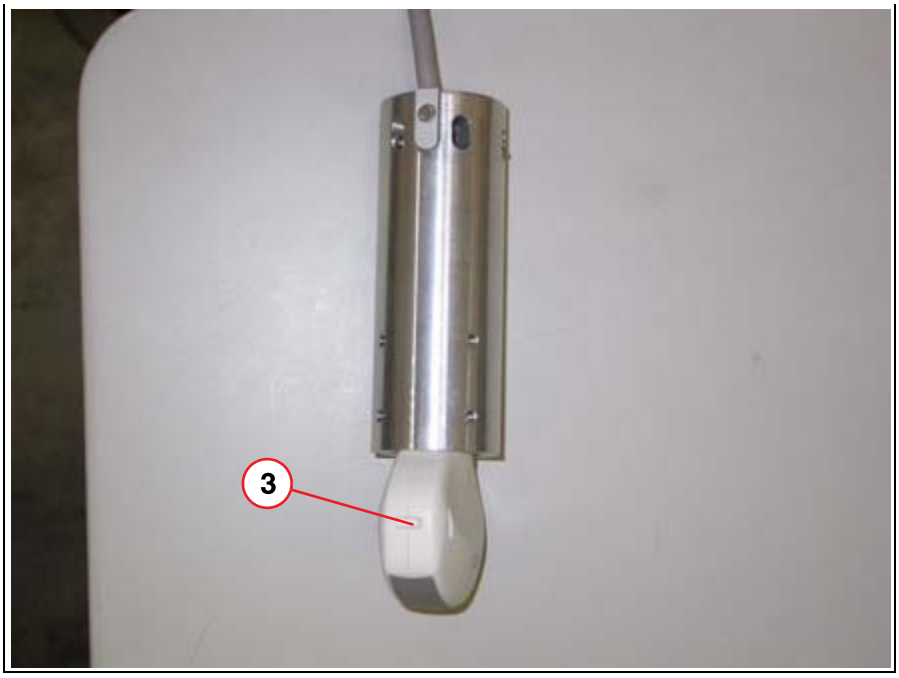



*Fig. 87: Probe_2*

- Install the holder (1/Fig. 85 / p. 108). (Also see the operating instructions).
- Insert an ultrasound probe (sector probe (1/Fig. 86 / p. 108) or array probe (2/Fig. 86 / p. 108)/(3/Fig. 87 / p. 109)) into the holder (3/Fig. 85 / p. 108). Carefully insert the probe lead into the longitudinal groove (4/Fig. 85 / p. 108).
- Plug in the lead (2/Fig. 85 / p. 108) and connect the probe to the ultrasound unit.
- Make the line connection (marked orange) between LITHOSTAR MODULARIS and ultrasound unit.

## Checking the Target on the Sonoline G20

*Fig. 88: Target_Test_1*

*Fig. 89: Target_Test_2*

**NOTE**

**The isocenter must be checked with every probe type and after every probe replacement.**

**NOTE**

**The names of the keys can differ depending on the language version.**

**For the comparison table, see the SONOLINE operating instructions**

- Use the "Image field/zoom" knob to set the value to 180 (1/Fig. 89 / p. 110).
- Slide the ultrasound probe all the way forward to the shock wave head.
- Press the "Measurement" key and select the measuring point via "Set".
- Use the tracker ball to move to the center of the crosshair. The display (2/Fig. 88 / p. 110) must show a value of 13 mm ± 1 mm (2/Fig. 88 / p. 110).
- Press the "Measurement" key ("Freeze" is deselected).
- Move the ultrasound probe all the way in the other direction.
- Press the "Measurement" key and select the measuring point via "Set".
- Use the tracker ball to move to the center of the crosshair. The display (2/Fig. 89 / p. 110) must show a value of 151 mm ± 1 mm.

  If this is not the case, the adjustment procedure must be repeated for the potentiometer in the ultrasound arm or the ultrasound arm must be replaced.

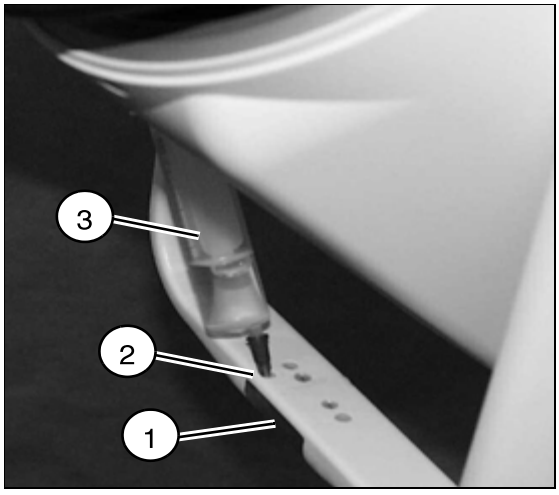



*Fig. 90: Phantom filling*

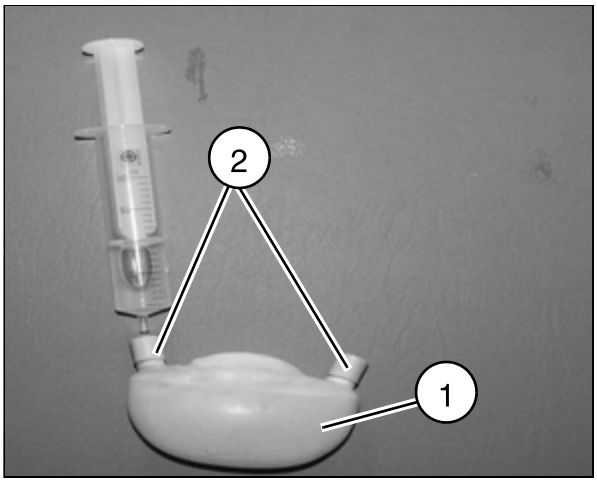



*Fig. 91: Water bladder*

## Checking Image Tilt

**NOTE**

**The isocenter must be checked with every probe type and after every probe replacement.**

- Check whether the isocenter phantom (1/Fig. 90 / p. 111) is filled with water; if not, remove the screw (2/Fig. 90 / p. 111) and add water with a syringe (3/Fig. 90 / p. 111). There may not be any air bubbles. Screw the screw back in.
- Lift up the isocenter phantom.
- Fill the water bladder with water (approx.100-120 ml, i.e., 5-6 syringes, each 20 ml) (1/Fig. 91 / p. 112):
  - Fill a syringe with distilled water. Remove any air that may be trapped in the syringe.
  - Insert the syringe needle into one of the valves (2/Fig. 91 / p. 112) and empty the syringe contents into the water bladder. The valve has a self-closing membrane.
  - Repeat the filling procedure until the water bladder is filled with approx. 100-120 ml water.
  - After filling, there may not be any air bubbles in the water bladder. If there are any air bubbles, remove them with the syringe.
- Spread contact gel on the isocenter phantom.
- Secure the water bladder (5/Fig. 85 / p. 108) with the holder (6/Fig. 85 / p. 108) to the isocenter phantom.
- Spread contact gel on the ultrasound probe.
- Use the "Image field/zoom" knob to set a value of "50" (Fig. 92 / p. 113) - bottom left of the ultrasound image.
- Move the probe forward (3/Fig. 85 / p. 108) until the isocenter crosshair is approx. in the center of the SONOLINE G20 screen.

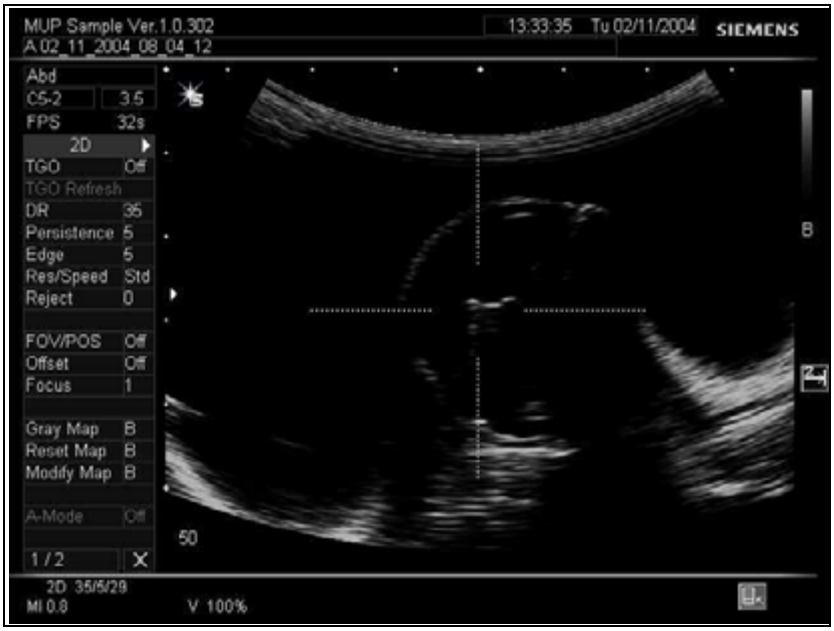



*Fig. 92: Basic settings_*

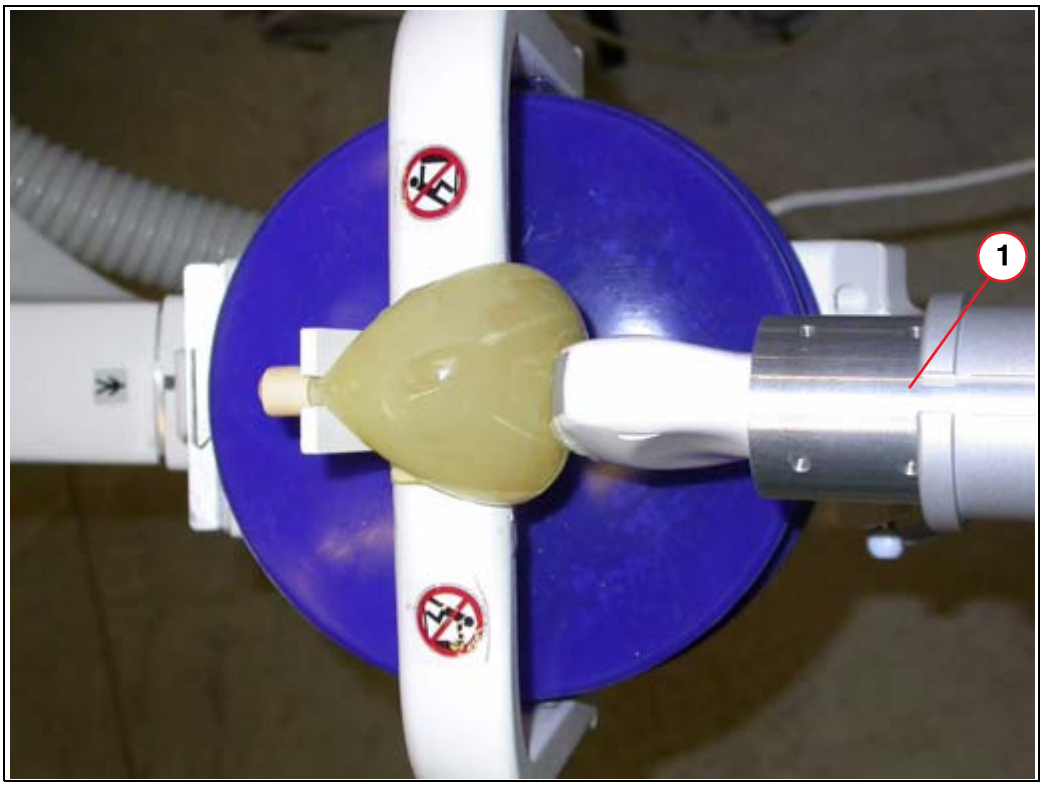



*Fig. 93: Ultrasound arm_*

- Operate the task menu and display this.
- Make the following basic settings at the ultrasound unit:

| Value: | Adjust using: | German | English | French | Spanish |
|---|---|---|---|---|---|
| 5 (Fig. 92 / p. 113) | Set the tracker ball to Edge (white background), then press ⊕ and set the value with the "Select" control. | FV | Edge | Côté | Contorno |
| 35 dB (Fig. 92 / p. 113) | Set the tracker ball to DR (white background), then press ⊕ and set the value with the "Select" control. | DR | Dyn Rng | DR | Cam Din |

**NOTE**

**Each press of the "Set" key increases the value by +1.The value can be changed in both directions via the "Select" control.**

- Set all slide controls all the way to the left.
- The image flip key may not be selected.
- The corresponding ultrasound probe is selected during switch-on. If there is a second ultrasound probe, select the probe with the key.
- Check whether the ultrasound arm is positioned as shown in (Fig. 85 / p. 108); if not, position it accordingly. The long slot must be visible (1/Fig. 93 / p. 113).

**Checking the Distance: Height**

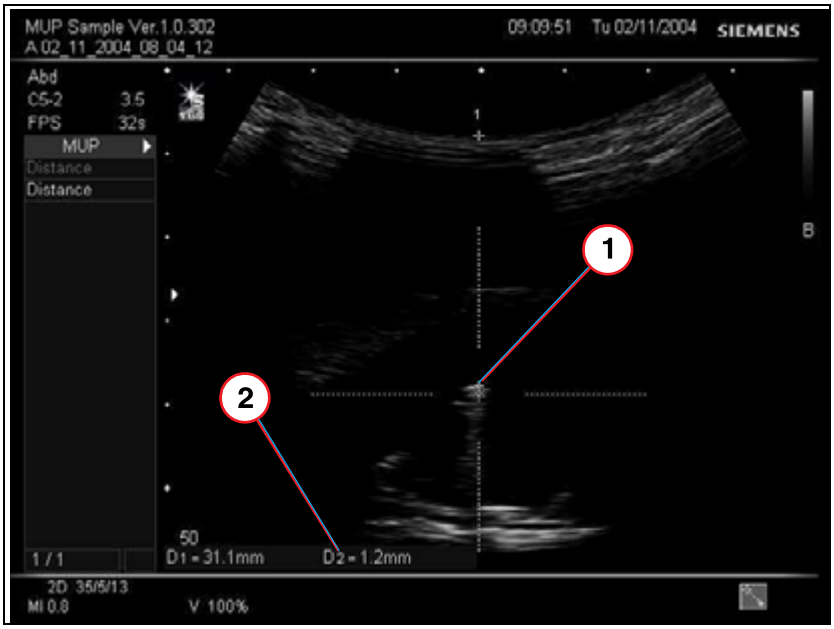



*Fig. 94: Distance_height*

- Press the "Measurement" key.

- Use the tracker ball to move the cross to the center of the crosshairs.
- Press the "Measurement" key.

- Move the tracker ball until the cross is in the center of the isocenter crosshair.
- Press the "Measurement" key.
- Move the "+2" cross via the tracker ball onto the longitudinal axis of the target line in the isocenter.
- Press the key.
- Use the tracker ball to move the cross horizontally into the center of the white area of the isocenter phantom.
- The value displayed for "D2" must be between 1 and 5 mm. This is valid only for the default values, see instructions SPL1-130.038.01... .
- Press the key.

**Checking the distance: Side**

- Press the key twice ("+1" cross is not needed for this measurement).

- Use the tracker ball to move the "+2" cross onto the horizontal axis of the target line at the height of the isocenter.

- Press the key.

- Use the tracker ball to move the cross horizontally into the center of the white area of the isocenter phantom.
- If the center point of the white area is not in the isocenter (permitted difference ± 0.5 mm from the center):

  - Make a note of the value of D2 (with the mathematical sign):

    If the display of the ball appears to the left of the isocenter, the correction value must have a negative sign in front (when to the right, a positive sign is in front).

  - Press key F6.
  - Select MUP with the tracker ball.
  - Press the “Set” key.
  - Press the “5” key.

  - Enter the password.
  - Select o.k. with the tracker ball.
  - Press the “Set” key.
  - Use the tracker ball to select the value during image tilt and increase it with the "Set" key.

| | | | |
|---|---|---|---|
| **German:** | Bildneigung Array | **French:** | Basculement d’image sondes conv. |
| **English:** | Image Tilt Array | **Spanish:** | Inclinar imagen transductor curvo |

  - Enter half the value of D2.

    **Example :** D2 = 1.2 mm ⇒ Enter -06.

  - Press the key.

- Check the difference; if the white area is not in the center of the isocenter, repeat the procedure.

- After the adjustment, attach the mount for the ultrasound probe to the hold point (7/Fig. 85 / p. 108). For each probe, check whether the adjustment in this position is also o.k. Do not make any change to the image tilt adjustment.
- Following the check, store the parts in the appropriate transport cases.

## Checking the Target on the Sonoline Adara

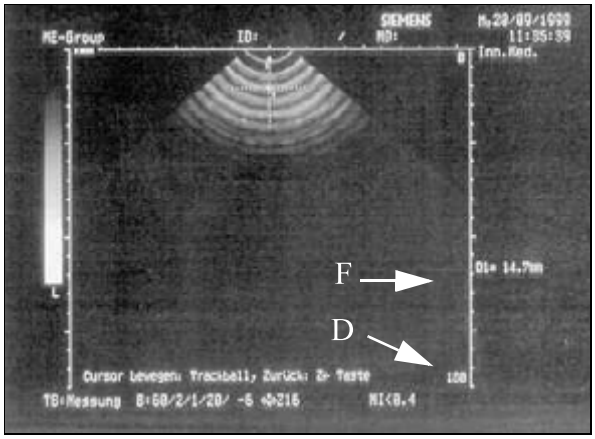



*Fig. 95: Screen 1*

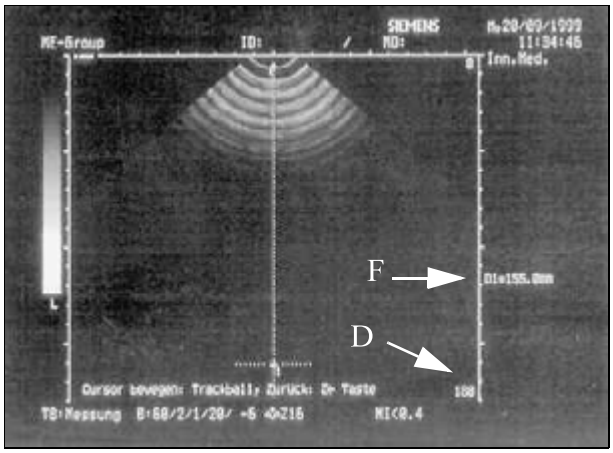



*Fig. 96: Screen 2*

**NOTE**

**The isocenter must be checked with every probe type and after every replacement of a probe.**

- Set the (D/Fig. 95 / p. 117) value to 180 using the knob.
- Slide the ultrasound probe all the way forward to the shock wave head.
- Press the key and select the measuring point.

- Use the tracker ball to move to the center of the crosshairs. A value of - see Table - must appear in the display (F/Fig. 95 / p. 117) that is relative to the probe.

| Probe | Change-over with | Value for D1 | |
|---|---|---|---|
| Sector (1/Fig. 86 / p. 108) | | 15 1 mm | with default values, see SPL1-130.038.01 |
| Array (2/Fig. 86 / p. 108) | | 13 1 mm | |

- Press the key ("Freeze" is deselected).
- Move the ultrasound probe all the way in the other direction.
- Press the key and select the measuring point.
- Use the tracker ball to move to the center of the crosshairs. A value of - see Table - must appear In the display (F/Fig. 96 / p. 117) that is relative to the probe. If this is not the case, the adjustment procedure must be repeated for the potentiometer in the ultrasound arm or the ultrasound arm must be replaced.

| Probe | Change-over with | Value for D1 | |
|---|---|---|---|
| Sector (1/Fig. 86 / p. 108) | | 153 1 mm | with default values, see SPL1-130.038.01 |
| Array (2/Fig. 86 / p. 108) | | 151 1 mm | |

- Press the key ("Freeze" is deselected).

## Checking Image Tilt

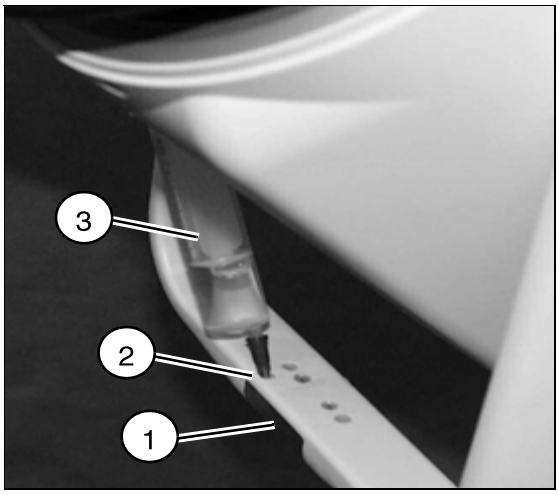



*Fig. 97: Phantom filling*

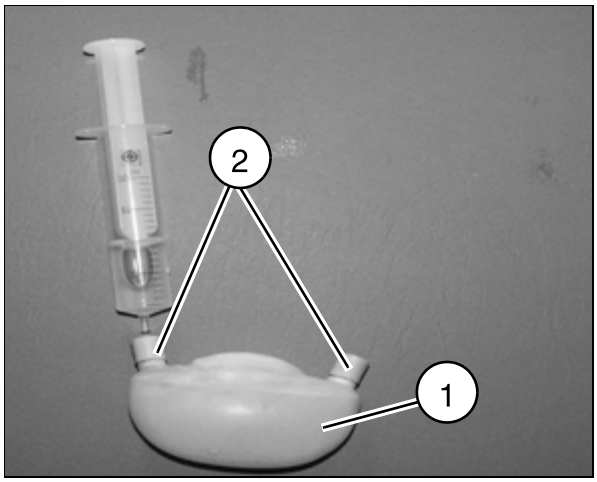



*Fig. 98: Water bladder*

**NOTE** **The isocenter must be checked with every probe type and after every replacement of a probe.**

- Check whether the isocenter phantom (1/Fig. 97 / p. 118) is filled with water; if not, remove the screw (2/Fig. 97 / p. 118) (2/Fig. 5) and add water with a syringe (3/Fig. 97 / p. 118). There may not be any air bubbles. Screw the screw back in.
- Lift up the isocenter phantom.
- Fill the water bladder with water (approx. 100 - 120 ml, i.e. 5 - 6 syringes, each 20 ml) (1/Fig. 98 / p. 119):

1. Fill a syringe with distilled water. Remove any air that may be trapped in the syringe.
2. Insert the syringe needle through one of the valves (2/Fig. 98 / p. 119) and empty the syringe contents into the water bladder. The valve has a self-closing membrane.
3. Repeat steps 1 and 2 until the water bladder is filled with approx. 100 - 120 ml water.
4. After filling, there may not be any air bubbles in the water bladder. If there are any air bubbles, remove them using the syringe.

- Spread contact gel on the isocenter phantom.
- Secure the water bladder (5/Fig. 85 / p. 108) with the holder (6/Fig. 85 / p. 108) to the isocenter phantom.
- Spread contact gel on the ultrasound probe.
- Use the knob to set a value of "60" (D/Fig. 99 / p. 120).
- Move the probe forward (3/Fig. 85 / p. 108) until the isocenter crosshair is approx. in the center of the SONOLINE Prima screen.

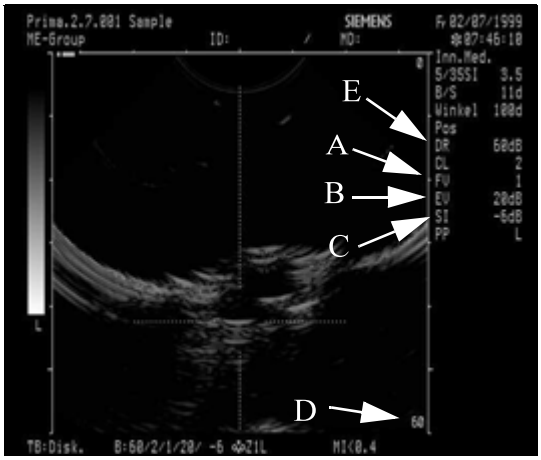



*Fig. 99: Screen 3*

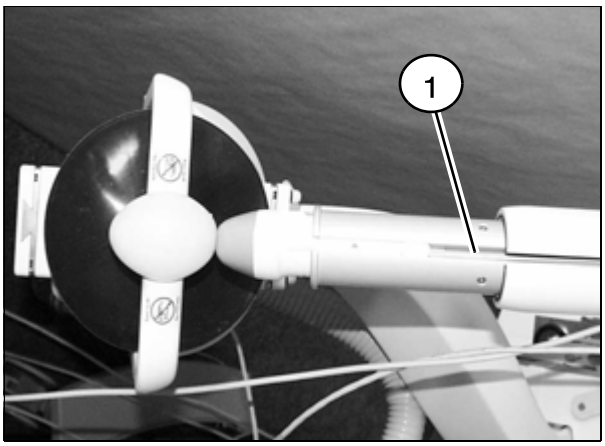



*Fig. 100: US centering*

- Make the following basic settings at the ultrasound unit:

| Value: | Adjust using: | German | English | French | Spanish |
|---|---|---|---|---|---|
| - 6 dB (C/Fig. 99 / p. 120) | Set the tracker ball to SI (white background), then press and set the value with the control. | SI | Output | Sortie | Salida |
| 20 dB (B/Fig. 99 / p. 120) | Knob B | EV | Gain | Gain | Ampl |
| 3 (A/Fig. 99 / p. 120) | Set the tracker ball to FV (white background), then press and set the value with the control. | FV | Edge | Côté | Contorno |

| | | | | | |
|---|---|---|---|---|---|
| 60 (D/Fig. 99 / p. 120) | Knob | ------- | ------- | ------- | ------- |
| 60 dB (E/Fig. 99 / p. 120) | Set the tracker ball to DR (white background), then press and set the value with the control. | DR | Dyn Rng | DR | Cam Din |

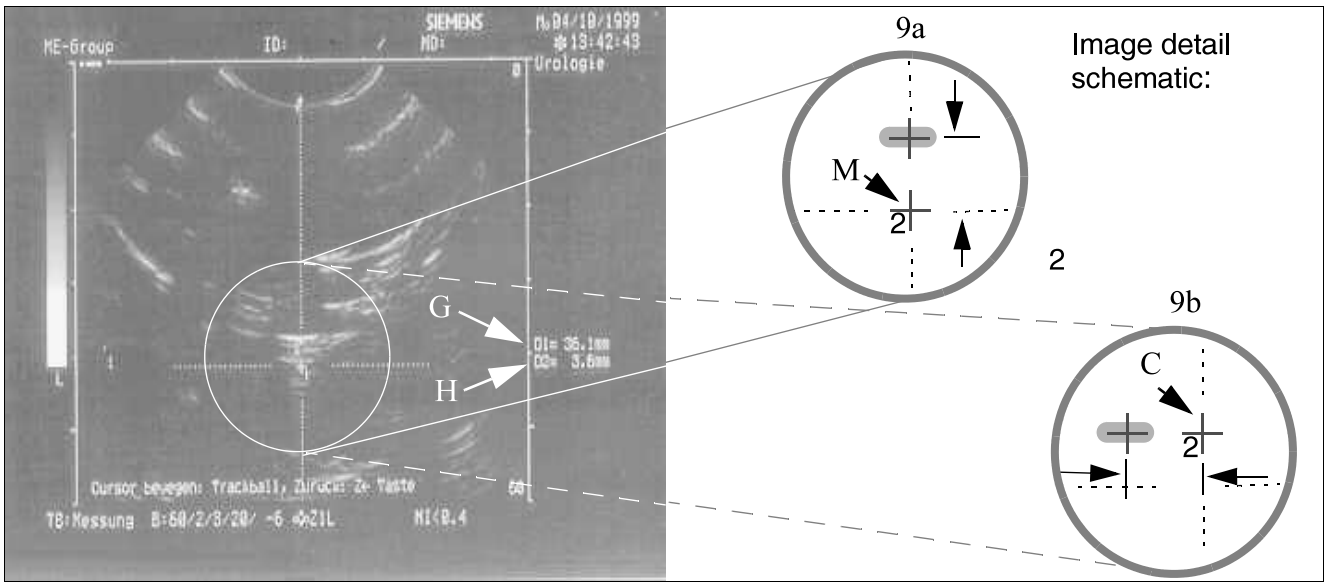



*Fig. 101: Screen 4*

- Set all slide controls all the way to the left.
- The image flip key may not be selected.
- The corresponding ultrasound probe is selected during switch-on. If there is a second ultrasound probe, the select the probe with the key.
- Check whether the ultrasound arm is as shown in (Fig. 100 / p. 120); if not, position it accordingly. The long slot must be visible (1/Fig. 100 / p. 120).

**Checking the Distance: Height** (9a/Fig. 101 / p. 121)

- Press the key.
- Move the tracker ball until the "+1" cross is in the center of the isocenter crosshair.
- The value displayed for "D1" (G/Fig. 101 / p. 121) must be between 33 and 36 mm; if not, move the probe appropriately in the longitudinal axis.
- Press the key.
- Move the "+2" cross using the tracker ball onto the longitudinal axis of the target line in the isocenter (M/Fig. 101 / p. 121).
- Press the key.

- Use the tracker ball to move the cross horizontally into the center of the white area (9a/Fig. 9) of the isocenter phantom.
- The value displayed for "D2" (H/Fig. 101 / p. 121) must be between 1 and 5 mm. This is valid only for the default values, see instructions, SPL1-130.038.01...
- Press the key.

**Checking the Distance: Side** (9b/Fig. 101 / p. 121)

- Press the key twice (cross "+1" is not needed for this measurement).
- Move the "+2" cross using the tracker ball onto the horizontal axis of the target line at the height of isocenter (C/Fig. 101 / p. 121).
- Press the key.
- Use the tracker ball to move the cross horizontally into the center of the white area of the isocenter phantom.
- If the center point of the white area (9b/Fig. 101 / p. 121) is not in the center (permitted difference: + 0.5 mm from the center):
  - Make a note of the value of D2 (with the mathematical sign): If the display of the ball (9b/Fig. 9) appears to the left of the isocenter, the correction value must have a negative sign in front (when to the right, a positive sign is in front).
  - Press the key.
  - Press the "F4" key.
  - Press the "5" key.
  - Select "MUP" with the tracker ball.
  - Press the key.
  - Enter the password.
  - Use the tracker ball to select the appropriate probe during image tilt.

| | | | |
|---|---|---|---|
| **German:** | Bildneigung Sektor Bildneigung Array | **French:** | Basculement d'image sondes sect. Basculement d'image sondes conv. |
| **English:** | Image Tilt Sector, Image Tilt Array | **Spanish:** | Incl. imagen transd. sect mecanico Inclinar imagen transductor curvo |

  - Press the key.
  - Enter half the value of D2 (H/Fig. 101 / p. 121).
    **Example (H/Fig. 9):** D2 = 1.2 mm Enter: -06 .
  - Press the key.
  - Press the key twice.
  - Check the difference; if the white area (9b/Fig. 101 / p. 121) is not in the center of the isocenter, repeat the procedure.
- Press the key.
- After adjusting the mount for the ultrasound probe, attach it on the mount (7/Fig. 85 / p. 108). For each probe, check whether the adjustment in this position is also okay. Do not make any change to the image tilt adjustment.
- Following the check, store the parts in the appropriate transport cases.

## Checking the Target on the Sonoline Prima

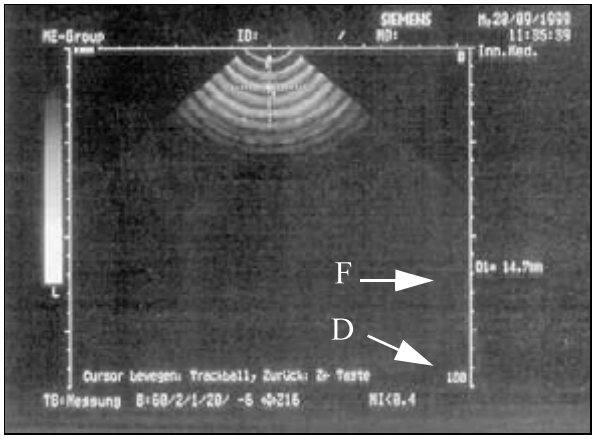



*Fig. 102: Screen 5*

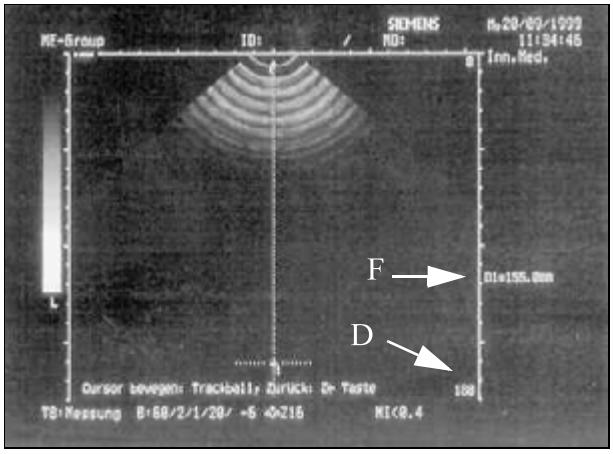



*Fig. 103: Screen 6*

**NOTE** **The isocenter must be checked with every probe type and after every replacement of a probe.**

- Set the value (D/Fig. 102 / p. 123) to 180 using the knob.
- Slide the ultrasound probe all the way forward to the shock wave head.
- Press the key and select the measuring point .
- Use the tracker ball to move to the center of the crosshairs. A value of - see Table - must appear in the display (F/Fig. 102 / p. 123) that is relative to the probe.

| Probe | Select using | Value for D1 | |
|---|---|---|---|
| Sector (1/Fig. 2) | | 15 1 mm | with default values, see SPL1-130.038.01 |
| Array (2/Fig. 2) | | 13 1 mm | |

- Press the key ("Freeze" is deselected).

- Move the ultrasound probe all the way in the other direction.
- Press the key and select the measuring point .
- Use the tracker ball to move to the center of the crosshairs. A value of - see Table - must appear in the display (F/Fig. 103 / p. 123) that is relative to the probe. If this is not the case, the adjustment procedure must be repeated for the potentiometer in the ultrasound arm or the ultrasound arm must be replaced.

| Probe | Select using | Value for D1 | |
|---|---|---|---|
| Sector (1/Fig. 2) | | 153 1 mm | with default values, see SPL1-130.038.01 |
| Array (2/Fig. 2) | | 151 1 mm | |

- Press the key ("Freeze" is deselected).

## Checking Image Tilt

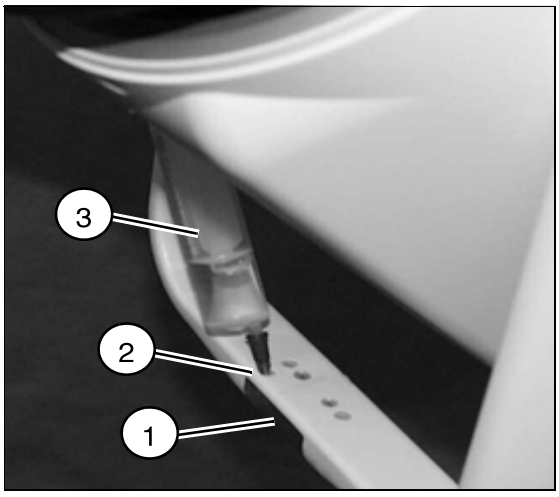



*Fig. 104: Phantom filling*

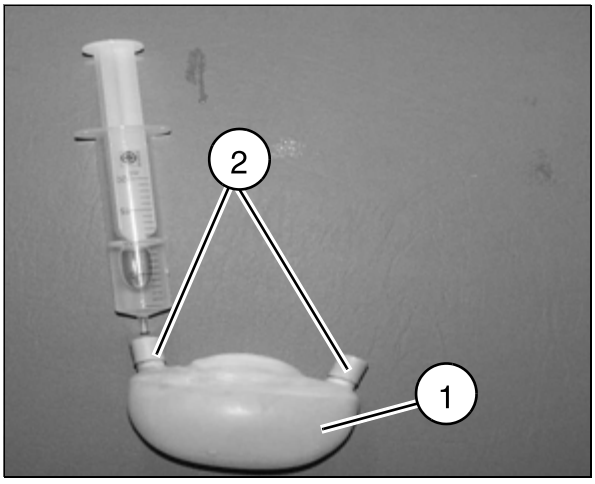



*Fig. 105: Water bladder*

**NOTE**

**The isocenter must be checked with every probe type and after every replacement of a probe.**

- Check whether the isocenter phantom (1/Fig. 104 / p. 124) is filled with water; if not, remove the screw (2/Fig. 104 / p. 124) and add water with a syringe (3/Fig. 104 / p. 124). There may not be any air bubbles. Screw the screw back in.
- Lift up the isocenter phantom.
- Fill the water bladder with water (approx. 100 - 120 ml, i.e. 5 - 6 syringes, each 20 ml) (1/Fig. 105 / p. 124):

1. Fill a syringe with distilled water. Remove any air that may be trapped in the syringe.
2. Insert the syringe needle through one of the valves (2/Fig. 105 / p. 124) and empty the syringe contents in the water bladder. The valve has a self-closing membrane.
3. Repeat steps 1 and 2 until the water bladder is filled with approx. 100 - 120 ml water.
4. After filling, there may not be any air bubbles in the water bladder. If there are any air bubbles, remove them using the syringe.

- Spread contact gel on the isocenter phantom.
- Secure the water bladder (5/Fig. 85 / p. 108) with the holder (6/Fig. 85 / p. 108) to the isocenter phantom.
- Spread contact gel on the ultrasound probe.
- Use the knob to set a value of "60" (D/Fig. 99 / p. 120).
- Move the probe forward (3/Fig. 85 / p. 108) until the isocenter crosshair is approx. in the center of the SONOLINE Prima screen.

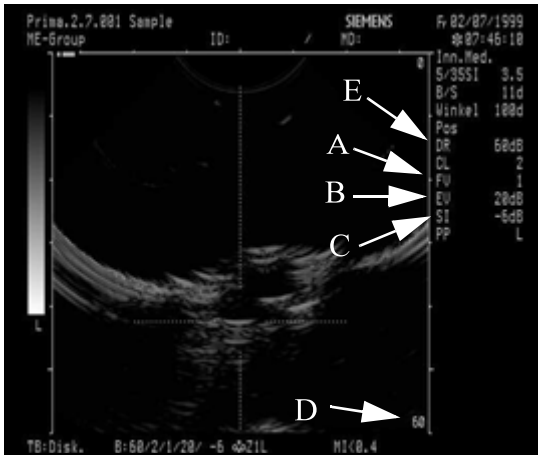



*Fig. 106: Screen 7*

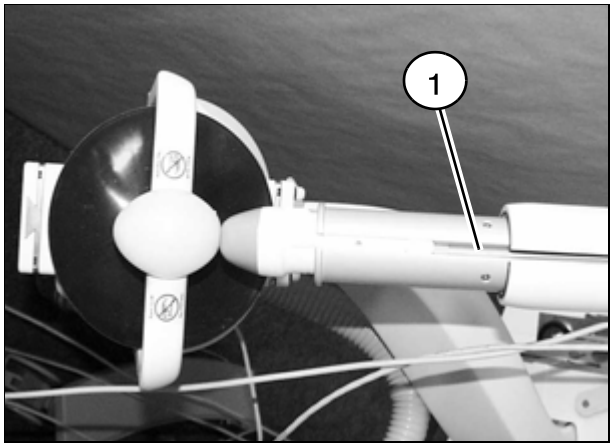



*Fig. 107: US phantom*

- Make the following basic settings at the ultrasound unit:

| Value: | Adjust using: | German | English | French | Spanish |
|---|---|---|---|---|---|
| - 6 dB (C/Fig. 106 / p. 125) | Knob | SI | Output | Sortie | Salida |
| 20 dB (B/Fig. 106 / p. 125) | Knob B/M | EV | Gain | Gain | Ampl |
| 3 (A/Fig. 106 / p. 125) | Set the tracker ball to FV (highlighted in white), then press | FV | Edge | Côté | Contorno |
| 60 (D/Fig. 106 / p. 125) | Knob | ------- | ------- | ------- | ------- |
| 60 dB (E/Fig. 106 / p. 125) | Knob | DR | Dyn Rng | DR | Cam Din |

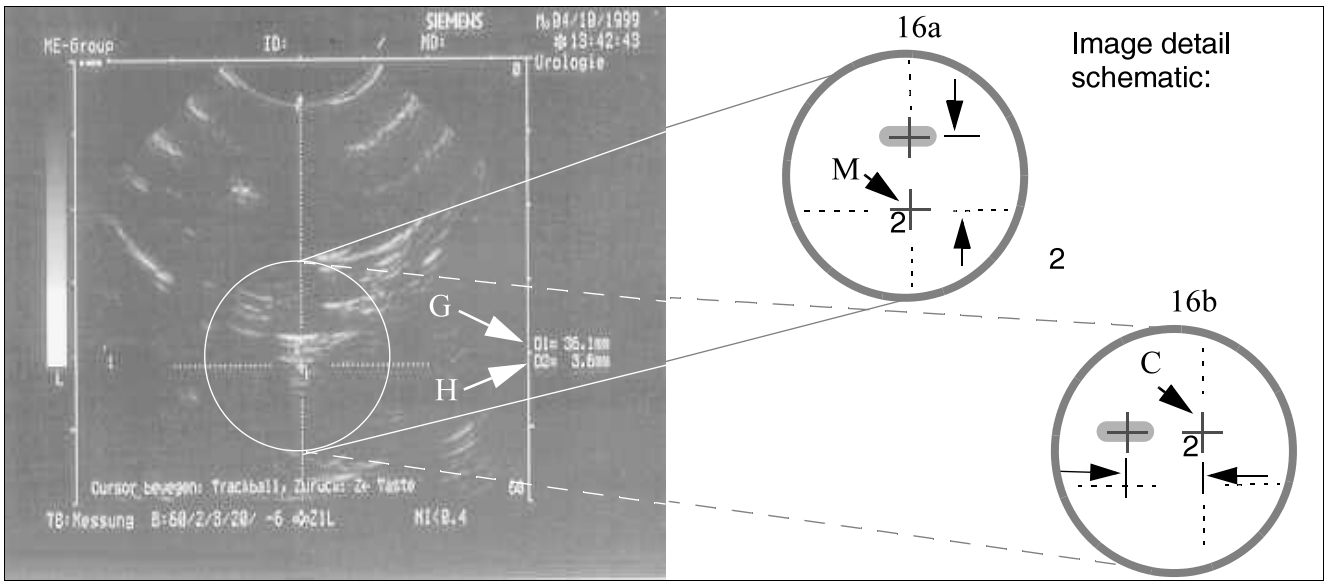



*Fig. 108: Screen 8*

- Set all slide controls all the way to the left.
- The image flip key may not be selected.
- Select the appropriate ultrasound probe:

| Sector probe | Array probe |
|---|---|

- Check whether the ultrasound arm is as shown in Fig. 15; if not, position it accordingly. The long slot must be visible (1/Fig. 107 / p. 126).

**Checking the Distance: Height** (16a/Fig. 108 / p. 127)

- Press the key.
- Move the tracker ball until the "+1" cross is in the center of the isocenter crosshair.
- The value displayed for "D1" (G/Fig. 108 / p. 127) must be between 33 and 36 mm; if not, move the probe appropriately in the longitudinal axis.
- Press the key.
- Move the "+2" cross using the tracker ball onto the longitudinal axis of the target line in the isocenter (M/Fig. 108 / p. 127).
- Press the key.
- Use the tracker ball to move the "+2" cross horizontally into the center of the white area (16a/Fig. 108 / p. 127) (16a/Fig. 16) of the isocenter phantom.
- The value displayed for "D2" (H/Fig. 16) must be between 1 and 5 mm. This is valid only for the default values, see instructions SPL1-130.038.01...
- Press the key.

**Checking the Distance: Side** (16b/Fig. 108 / p. 127)

- Press the key twice (cross "+1" is not needed for this measurement).
- Use the tracker ball to move the "+2" cross onto the horizontal axis of the target line (C/Fig. 108 / p. 127).
- Press the key.

- Use the tracker ball to move the "+2" cross horizontally into the center of the white area of the isocenter phantom.
- If the center point of the white area (16b/Fig. 108 / p. 127) is not in the center (permitted difference: + 0.5 mm from the center):
  - Make a note of the value of D2 (with the mathematical sign): If the display of the ball (16b/Fig. 108 / p. 127) appears to the left of the isocenter, the correction value must have a negative sign in front (when to the right, a positive sign is in front).
  - Press the key.
  - Press the "F4" key.
  - Press the "5" key.
  - Select "MUP" with the tracker ball.
  - Press the key.
  - Enter the password.
  - Use the tracker ball to select the appropriate probe during image tilt.

| | | | |
|---|---|---|---|
| **German:** | Bildkippung Sektor Bildkippung Array | **French:** | Basculement d'image sondes sect. Basculement d'image sondes conv. |
| **English:** | Image Tilt Sector, Image Tilt Array | **Spanish:** | Incl. imagen transd. sect mecanico Inclinar imagen transductor curvo |

  - Press the key.
  - Enter half the value of D2 (H/Fig. 108 / p. 127).
    **Example (H/Fig. 16):** D2 = 1.2 mm Enter: -06 .
  - Press the key.
  - Press the key twice.
  - Check the difference; if white area (16b/Fig. 108 / p. 127) (16b/Fig. 16) is not in the center of the isocenter, repeat the procedure.
  - Press the key.
- After adjusting the mount for the ultrasound probe, attach it on the mount (7/Fig. 85 / p. 108). For each probe, check whether the adjustment in this position is also okay. Do not make any change to the image tilt adjustment.
- Following the check, store the parts in the appropriate transport cases.

## Standard Programming

The SIREMOBIL Iso-C with LITHOSTAR MODULARIS is shipped with an organ program that is programmed with one of the following default values:

The changes from Standard Organ program 1 appear in bold and are underlined.

The work procedure is described in the SIREMOBIL Iso-C User Manual.

The program name is "Litho".

| **Organ program 1, Litho (User Setup, CTRL+U)** | | | | | |
|---|---|---|---|---|---|
| Mode of operation | DL | IDL | DR | SUB | Road-map |
| Program name | Stan-dard | Stan-dard | Standard | Stan-dard | Stan-dard |
| Dose rate | MID | HIGH | HIGH | HIGH | HIGH |
| SIREMATIC normal | HC2 | HC2 | n.a. (DR850W) | n.a. (Iodine) | n.a. (Iodine) |
| SIREMATIC push | HC2 | HC2 | n.a. (DR850W) | n.a. | n.a. |
| Noise red. Low | K = 4 | K = 4 | K = 4 | n.a. | n.a. |
| Noise red. High | K = 8 | K = 8 | K = 16 | n.a. | n.a. |
| Dose reduction low | n.a. | High | n.a. | n.a. | n.a. |
| Dose reduction high | n.a. | High | n.a. | n.a. | n.a. |
| Auto LIH disk transfer | NO | NO | n.a. | n.a. | n.a. |
| Auto transfer each image | n.a. | NO | n.a. | n.a. | n.a. |
| Disk transfer rate | 0 | n.a. | n.a. | n.a. | n.a. |
| Auto disk transfer | n.a. | n.a. | NO | n.a. | n.a. |
| Subtraction | n.a. | n.a. | n.a. | MAX | MAX |
| Landmark | n.a. | n.a. | n.a. | 10% | NO |
| Video signal at document | n.a. | n.a. | n.a. | POS | POS |
| Image display | n.a. | n.a. | n.a. | POS | POS |

# Selecting the MODULARIS Crosshairs on the SONOLINE G20

## Ultrasound Localization

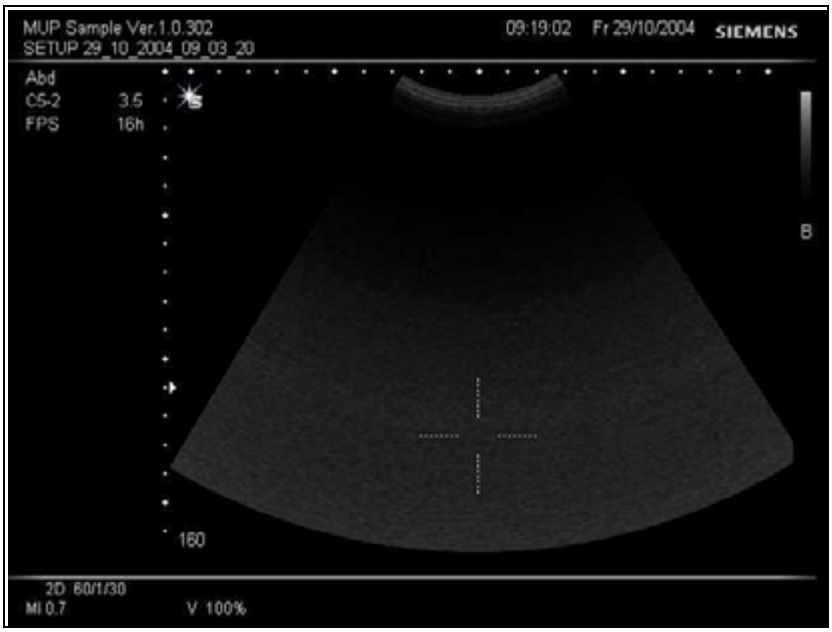



*Fig. 109: G20 cross_01*

- In the case of ultrasound localization, a mount is installed on the shock wave head and can be used to hold an ultrasound probe.

Only the following probes can be used:

C5-2 Convex Array 3.5 MHz

- Press the “F6” key.
- Select MUP with the tracker ball.
- Press the ⊕ key.
- Enter the password.
- Use the tracker ball to select "Litho Mode no X-ray”.
- Use the tracker ball to select "Save".
- Press the ⊕ key.
- Deselect the screensaver on the SONOLINE G20 (see also the SONOLINE G20 operating instructions).
- A cross is displayed when a probe is selected.

# Selecting the MODULARIS Crosshairs on the SONOLINE Adara

## Ultrasound Localization

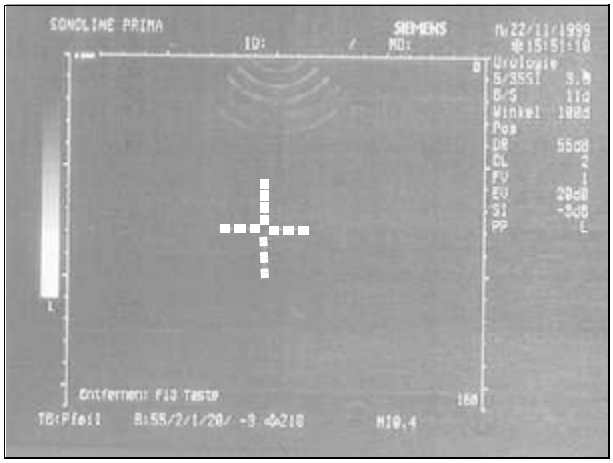



*Fig. 110: Screen 9*

In the case of ultrasound localization, a mount is installed on the shock wave head and can be used to hold an ultrasound probe.

Only the following probes can be used:

| | |
|---|---|
| | 3.5C40S Convex array, 3.5 MHz |
| | 3.5/5.0 SI Sector probe |

- Press the "F4" key.
- Press the "5" key.
- Select MUP with the tracker ball.
- Press the ⊕ key.
- Enter the password.
- Use the tracker ball to select "Litho Mode no X-ray".
- Press the ⊕ key.
- Use the tracker ball cursor to select "Litho Mode no X-ray".
- Press the ⊕ key.
- Press the ↩ key twice.
- Deselect the screensaver on the SONOLINE Adara (see also the SONOLINE Adara operating instructions).
- When one of the probes is selected, the following crosshairs are displayed (Fig. 110 / p. 131).

# Selecting the MODULARIS Crosshairs on the SONOLINE Prima

## Ultrasound Localization

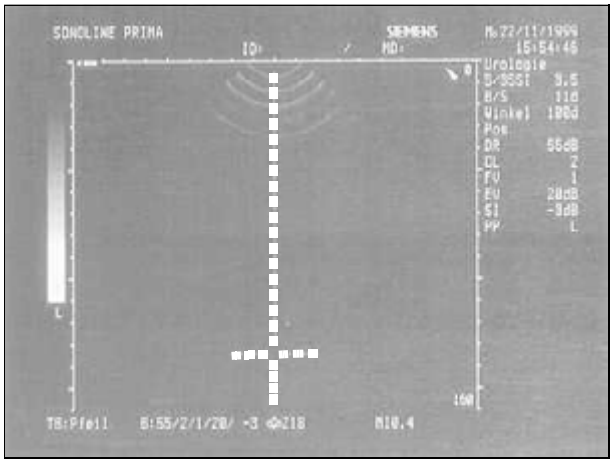



*Fig. 111: Screen 10*

In the case of ultrasound localization, a mount is installed on the shock wave head and can be used to hold an ultrasound probe.

Only the following probes can be used:

| | |
|---|---|
| | 3.5C40S Convex array, 3.5 MHz |
| | 3.5/5.0 SI Sector probe |

- Press the "F4" key.
- Press the "5" key.
- Select MUP with the tracker ball.
- Press the ⊕ key.
- Enter the password.
- Use the tracker ball to select "Litho Mode no X-ray".
- Press the ⊕ key.
- Use the tracker ball cursor to activate "Litho Mode no X-ray".
- Press the ⊕ key.
- Press the ↩ key twice.
- Deselect the screensaver on the SONOLINE Prima (see also the SONOLINE Prima operating instructions).
- When one of the probes, or is selected, the following crosshairs are displayed.

## Overview of Functions

| Function | Value | Comment |
|---|---|---|
| Litho Mode, Litho Mode, Mode Litho, Mode Lite | Ein/Aus, On/Off, Actif/Inactiv, Pren/Apag | Selecting the ultrasound monitoring. You can select either ultrasound monitoring or ultrasound localization. |
| Litho-Mode ohne X-ray, Litho Mode w/o X-ray, Mode Litho sans rayonnement X, Mode lito sin rayos X | Ein/Aus, On/Off, Actif/Inactiv, Pren/Apag | Selecting ultrasound localization. You can select either ultrasound monitoring or ultrasound localization. |
| Ziel Sektor, Target Sector, Cible sondes sectorelles, Objetivo transd. sect mecanico | | The value is set by the software and cannot be altered. |
| Ziel Array, Target Array, Cible sondes convexes, Objetivo transductor curvo | | The value is set by the software and cannot be altered. |
| Bildkippung Sektor, Image Tilt Sector, Basculement d' image sondes sect., Incl. imagen transd. sect mecanico | _ _ *0.1° | Isocenter setting |
| Bildkippung Array, Image Tilt Array, Basculement d' image sondes conv. Inclinar imagen transductor curvo | _ _ *0.1° | Isocenter setting |
| Baud-Rate, Baud rate, Débits bauds, Velocidad Baudio | 9600 | Checking the settings with software/default values, download/reload. |
| Datenlänge Data Length Longueur Données Cantidad de datos | 8 | |
| Parität, Parity, Parté, Paridad | UNGERADE ODD IMP. IMPAR | |
| Stop bit, Stop bit, Stop bit, Stop bit | 1 | |
| ACK Codierung, ACK Code, Code ACK, Codigo ACK | 06 | |

## Read out the Software Version G20

- The software version is displayed on the monitor during power-up of the unit.

## Reading Out the Adara Software Version

- Press the "F4" key.
- Press the "5" key.
- Select service with the tracker ball.
- Press the key.
- Enter the password.
- Use the tracker ball to select "System configuration".
- Press the key.
- The software version is displayed.

## Reading Out the Prima Software Version

- Enter "VERSION#=z". Note the following:
  - You must have at least version V2.8.0 installed.
  - Use capital letters to make entries, the ⇧ key **may** only be used for the # symbol.
  - The entry is not visible on the monitor.

| | |
|---|---|
| Chapter 3: | - Under German Windows 95/98/NT: Stop bits changed to “1”.<br>- Under English Windows 95/98/NT: Stop bits changed to “1”. |